Chapterwise DPP for NEET

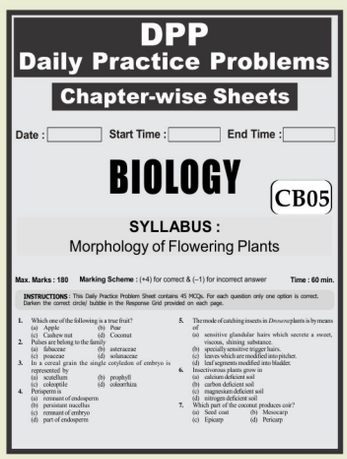
disha
Nurturing Ambitions

BIOLOGY

Collection of 1755+ MCQs based on NCERT

Improves your Score by at least 20%

38 Chapters based on NCERT



DPP
Daily Practice Problems
Chapter-wise Sheets

Date : Start Time : End Time :

BIOLOGY CB05

SYLLABUS :
Morphology of Flowering Plants

Max. Marks : 180 Marking Scheme : (+4) for correct & (–1) for incorrect answer Time : 60 min.

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which one of the following is a true fruit?
(a) Apple (b) Pear
(c) Cashew nut (d) Coconut
2. Pulses are belong to the family
(a) fabaceae (b) asteraceae
(c) poaceae (d) solanaceae
3. In a cereal grain the single cotyledon of embryo is represented by
(a) scutellum (b) prophyll
(c) coleoptile (d) coleorhiza
4. Perisperm is
(a) remnant of endosperm
(b) persistant nucellus
(c) remnant of embryo
(d) part of endosperm
5. The mode of catching insects in *Drosera* plants is by means of
(a) sensitive glandular hairs which secrete a sweet, viscous, shining substance.
(b) specially sensitive trigger hairs.
(c) leaves which are modified into pitcher.
(d) leaf segments modified into bladder.
6. Insectivorous plants grow in
(a) calcium deficient soil
(b) carbon deficient soil
(c) magnesium deficient soil
(d) nitrogen deficient soil
7. Which part of the coconut produces coir?
(a) Seed coat (b) Mesocarp
(c) Epicarp (d) Pericarp

Scoring Grid	DAILY PRACTICE PROBLEM DPP CHAPTERWISE CP05 - BIOLOGY			
	Total Questions	45	Total Marks	180
	Attempted		Correct	
	Incorrect		Net Score	
	Cut-off Score	45	Qualifying Score	60
	Success Gap = Net Score – Qualifying Score			
	Net Score = (Correct × 4) – (Incorrect × 1)			

[redacted]

EBD_7201

• **Corporate Office :** 45, 2nd Floor, Maharishi Dayanand Marg, Corner Market,
Malviya Nagar, New Delhi-110017
Tel. : 011-49842349 / 49842350

rishimudgalrm.blogspot.com

Typeset by Disha DTP Team

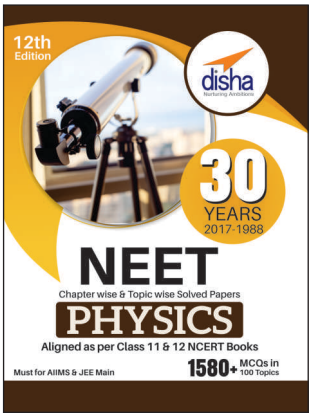
For further information about books from DISHA,
Log on to www.dishapublication.com or email to info@dishapublication.com

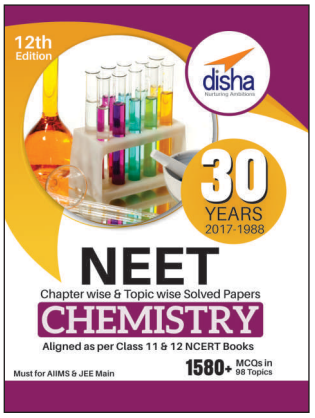
[redacted]

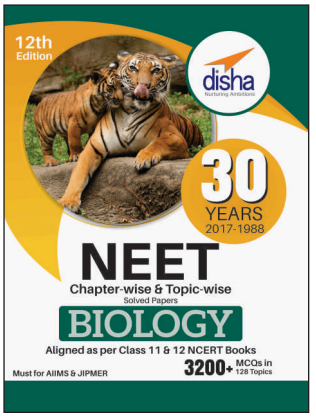
INDEX/CHAPTERS

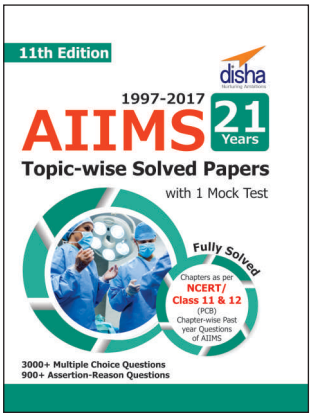
rishimudgalrm.blogspot.com

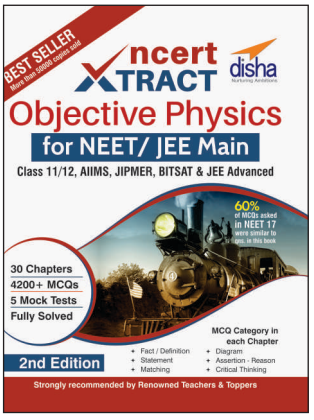
Disha's Bestseller for
NEET/AIIMS/ JIPMER

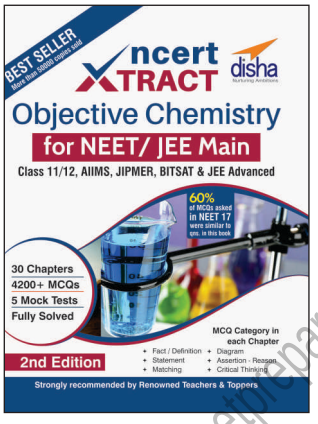


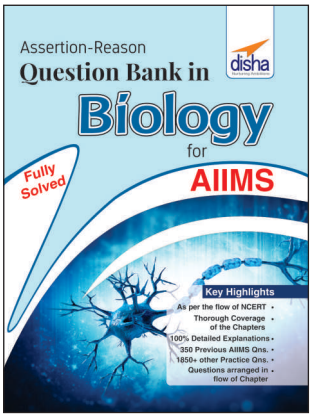


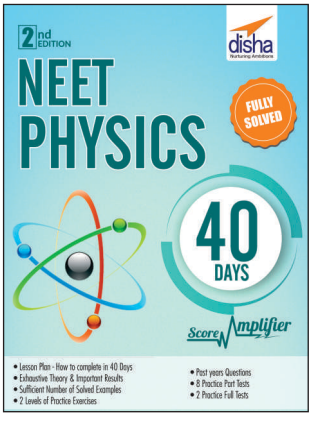


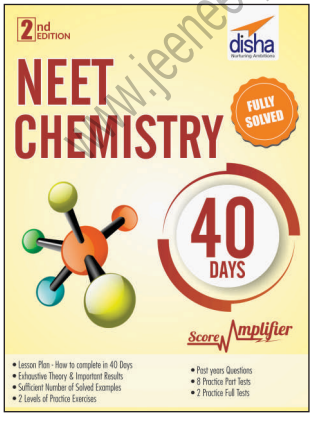


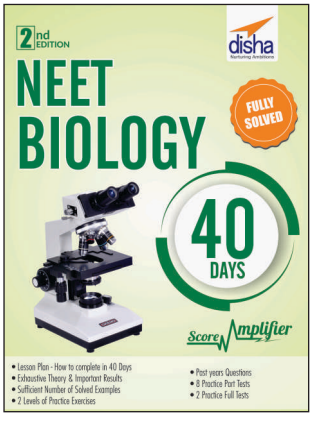


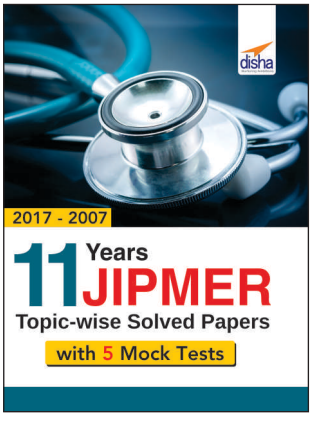


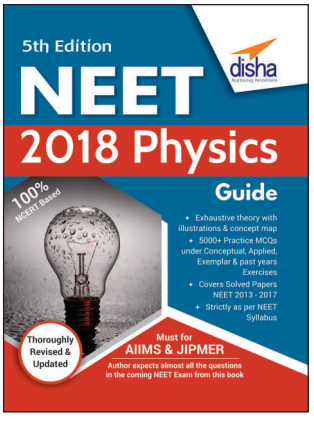


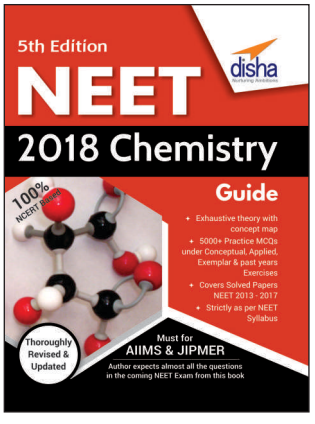


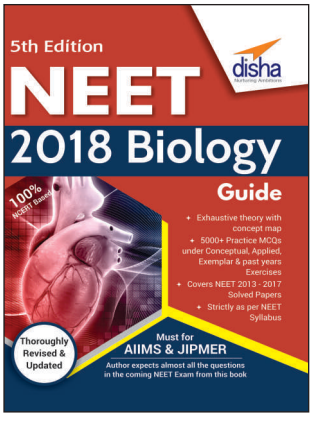


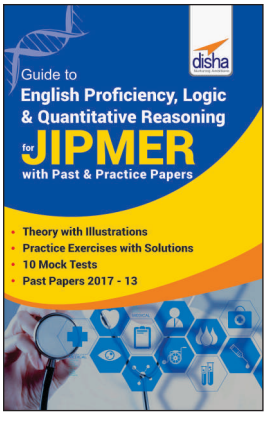












DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB01

SYLLABUS : The Living World

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. The living organisms can be unexceptionally distinguished from the non-living things on the basis of their ability for
(a) interaction with the environment and progressive evolution
(b) reproduction
(c) growth and movement
(d) responsiveness to touch.

2. Which one of the following animals is correctly matched with its particular named taxonomic category ?
(a) Tiger - *tigris*, the species
(b) Cuttle fish - mollusca, a class
(c) Humans - primata, the family
(d) Housefly - musca, an order

3. Taxonomic hierarchy refers to
(a) Step-wise arrangement of all categories for classification of plants and animals
(b) A group of senior taxonomists who decide the nomenclature of plants and animals
(c) A list of botanists or zoologists who have worked on taxonomy of a species or group
(d) Classification of a species based on fossil record

4. Choose correct scientific name of mango.
(a) *Mangifera Indica*
(b) *Mangifera indica* Linn
(c) *Mangifera indica* Hook.
(d) *Mangifera indica* L

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ

Space for Rough Work

5. Arrange the following taxonomic categories in increasing number of common characteristics w.r.t. plant mango
A. Dicotyledonae
B. Polymoniales
C. *Mangifera*
D. Angiospermae
E. Anacardiaceae
(a) $A \rightarrow D \rightarrow B \rightarrow E \rightarrow C$
(b) $A \rightarrow D \rightarrow C \rightarrow B \rightarrow E$
(c) $D \rightarrow A \rightarrow B \rightarrow E \rightarrow C$
(d) $D \rightarrow A \rightarrow C \rightarrow E \rightarrow B$

6. The common characteristics between brinjal and wheat can be observed maximum at the level of their.
(a) Division (b) Phylum
(c) Kingdom (d) Both (b) and (c)

7. Study of number of chromosomes for resolving difficulties in classification is used in
(a) Chemotaxonomy
(b) Morphotaxonomy
(c) Cytotaxonomy
(d) Biochemical taxonomy

8. Most names in biological nomenclature of living organisms are taken from which language?
(a) Hindi (b) Latin
(c) German (d) French

9. The main objective of plant taxonomy is
(a) to study the world's flora
(b) to provide a method for identification and nomenclature
(c) to provide Latin 'scientific' names for every group of plants in the world
(d) all of these

10. Which one of the following has least similar characters?
(a) Family (b) Class
(c) Genus (d) Species

11. The ascending or descending arrangement of taxonomic categories is called as
(a) classification (b) taxonomy
(c) hierarchy (d) key

12. Select the false statement
(a) Carolus Linnaeus described plants and classified them on the basis of their sexual parts
(b) Some facts established by accurate and repeated observations do not require further verification
(c) Study of the vestigeal organs is called teleology
(d) 'White Revolution' resulted in enhanced production of milk

13. Animal taxonomists have named the animals according to:
(a) International class for Zoology Nomenclature
(b) Indian code for Zoology Nomenclature
(c) International classification for Zoological Nomenclature
(d) International code for Zoological Nomenclature

14. Which of the following statement is not true?
(a) Homeostasis is a fundamental property of life
(b) When the external temperature is warm, the superficial blood vessels constrict to prevent loss of body heat
(c) Human beings are endothermic
(d) Human beings are homeothermic

15. Species is :
(a) population of individuals having same genotypes and phenotypes
(b) a group of individuals inhabiting a geographical area
(c) a group of interbreeding populations
(d) population of one type

16. The usage of binomial names, for plant species was accepted by all after the publication of the work by :
(a) Hooker (b) Linnaeus
(c) Bentham (d) Darwin

17. Which of the following is less general in characters as compared to genus ?
(a) Species (b) Division
(c) Class (d) Family

RESPONSE GRID					
	5. ⓐⓑⓒⓓ	**6.** ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ
	10. ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ
	15. ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ		

Space for Rough Work

18. A taxon with reference to classification of living organisms can be defined as
(a) a group of similar genera
(b) a group of similar species
(c) a group of organisms based on chromosome numbers
(d) a group of any one rank of organisms

19. Species are considered as
(a) Real units of classification devised by taxonomists
(b) Real basic units of classification
(c) The lowest units of classification
(d) Artificial concept of human mind which cannot be defined in absolute terms

20. Linneaus system of classification is :
(a) Natural (b) Artificial
(c) Phylogenetic (d) Progressive

21. The book systema naturae was written by
(a) Carolus Von Linnaeus
(b) Hutchinson
(c) Engler and Prantl
(d) Bentham & Hooker

22. "Ordines Anomali" of Bentham and Hooker includes :
(a) Seed plants showing abnormal forms of growth and development
(b) Plants represented only in fossil state
(c) Plants described in the literature but which Bentham and Hooker did not see in original
(d) A few orders which could not be placed satisfactory in the classification.

23. What is true for individuals of same species?
(a) Live in same niche
(b) Live in same habitat
(c) Interbreeding
(d) Live in different habitat

24. Biosystematics aims at
(a) Identification and arrangement of organisms on the basis of their cytological characteristics
(b) The classification of organisms based on broad morphological characters
(c) Delimiting various taxa of organisms and establishing their relationships
(d) The classification of organisms based on their evolutionary history and establishing their phylogeny on the totality of various parameters from all fields of studies

25. An animal with same generic, specific and subspecific names is
(a) man (b) gorilla
(c) rabbit (d) elephant

26. Two similar holotypes are called
(a) Isotypes (b) Neotypes
(c) Syntypes (d) Mesotypes

27. Which of the following is not a taxon?
(a) Carnivora (b) Insectivora
(c) Herbivora (d) Mastigophora

28. The category which includes related families is
(a) Class (b) Phylum
(c) Order (d) Kingdom

29. NBRI is situated at
(a) Calcutta (b) Bombay
(c) Madras (d) Lucknow

30. A duplicate of nomenclature type is termed by a taxonomist as
(a) Syntype (b) Neotype
(c) Paratype (d) Isotype

31. Classification based on sequencing of DNA and chemical nature of protein is
(a) Chemotaxonomy
(b) Cytotaxonomy
(c) Adansonian taxonomy
(d) Karyotaxonomy

RESPONSE GRID					
	18. ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ
	23. ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ
	28. ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	

Space for Rough Work

32. *Rattus rattus* scientific name is an example of
(a) Autonyms (b) Tautonyms
(c) Synonyms (d) Homonyms

33. Species belonging to different time period are called
(a) Syntype (b) Paratype
(c) Lectotype (d) Isotype

34. A new nomenclatural type submitted when the original material is missing is known as
(a) Holotype (b) Isotype
(c) Paratype (d) Neotype

35. Choose the incorrect statement regarding herbarium
(a) Dried specimens are poisoned by using DDT
(b) The collections are kept inside metallic vasculum
(c) Herbarium sheet is 41 × 29 cm
(d) It is used for alpha taxonomic research

36. No non-living object is capable of reproduction or replication by itself. Although reproduction can not be an all-inclusive defining characteristics of living organisms because
(a) Organisms like mules do not reproduce
(b) It brings about variation in offsprings
(c) Clones are blueprints of their parents
(d) Drones (male honey bees) are produced parthenogenetically

37. Which of the following have more characters in common ?
(a) Order (b) Class
(c) Phylum (d) Family

38. Mark the odd one in the following:
(a) Family (b) Class
(c) Taxon (d) Phylum

39. Which of the following is a name for a taxon that is identical to other such name?
(a) Autonym (b) Synonym
(c) Homonym (d) Tautonym

40. Which of the following is an automatically created name?
(a) Autonym
(b) Synonym
(c) Homonym
(d) Tautonym

41. When the specific epithet exactly repeats generic name, it is called
(a) Basionym (b) Synonym
(c) Homonym (d) Tautonym

42. Which of the following is most important for speciation ?
(a) Seasonal isolation
(b) Reproductive isolation
(c) Behavioural isolation
(d) Temporal isolation

43. Species occurring in different geographical areas are called as
(a) Sibling (b) Sympatric
(c) Allopatric (d) Neopatric

44. All members of different species of plants and animals present in particular area make up
(a) Population (b) Community
(c) Ecosystem (d) Biosphere

45. The study of the kind of life in outer space is known as :
(a) ecology (b) evolution
(c) anthropology (d) exobiology

RESPONSE GRID					
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ
	37. ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ
	42. ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 1 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB02

SYLLABUS : Biological Classification

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which of the following processes are involved in the reproduction of protista?
(a) Binary fission and fragmentation
(b) Cell fusion and zygote formation
(c) Spore formation and fragmentation
(d) Budding and spore formation

2. In prokaryotes, the genetic material is
(a) linear DNA with histones
(b) circular DNA with histones
(c) linear DNA without histones
(d) circular DNA without histones

3. Which of the following bacteria carry out oxygenic photosynthesis by means of a photosynthetic apparatus similar to the eukaryotes?
(a) Purple sulphur bacteria
(b) Green sulphur bacteria
(c) Cyanobacteria
(d) More than one option is correct

4. Bacteria is a group of prokaryotic organisms which is characterised by
(a) 70 S ribosomes
(b) Peptidoglycan cell wall
(c) Simple structure and complex behaviour
(d) All of the above.

5. What may be a 'photosynthetic protistian' to one biologist may be 'a plant' to another? Which of the given below features of slime moulds shows linkage with plant?
(a) Presence of holozoic nutrition
(b) Presence of diverse sexual reproduction
(c) Slime moulds have cellulosic spore wall
(d) Formation of fruiting bodies

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

6. Choose the correct match
(a) *Gonyaulax* – Red sea
(b) *Euglena* – Chlorophyll a & c
(c) Desmids – Chrysophytes
(d) *Gymnodinium* – Hemicellulosic plates in wall

7. Nuclear dimorphism is shown by
(a) *Paramecium* (b) *Amoeba*
(c) *Plasmodium* (d) *Trypanosoma*

8. Most common type of genetic material present in bacteriophages is
(a) ds RNA (b) ss RNA
(c) ds DNA (d) ss DNA

9. Which of the following statement about Mycoplasma is true:
(a) They are smallest, disease causing thin walled organisms
(b) They differ from viruses in being cellular in organisation
(c) Insensitive to several antibiotics as they have 70S ribosomes
(d) They can survive without photosynthetic pigments and genetic material

10. Consider the following characters:
Non-motile spores, saprophytic unicellular eukaryotes, transfer of gametes by wind currents, Differentiation of plasmodium under suitable conditions.
How many of the characters given in box belong to slime moulds?
(a) Four (b) One
(c) Three (d) Two

11. Eubacteria can be differentiated from archaebacteria on the basis of
(a) Ribosomes (b) Gene of tRNA
(c) Cell wall (d) Nutrition

12. Select the pair that consists of plant or animal bacterial diseases.
(a) Cholera and typhoid
(b) Citrus canker and crown gall
(c) Malaria and dengue
(d) Both (a) and (b)

13. Cyanobacteria are classified under which of the following kingdoms?
(a) Monera (b) Protista
(c) Algae (d) Plantae

14. _____ are important decomposers that cause decay and decomposition of dead bodies of plants and animals.
(a) Saprotrophic bacteria
(b) Saprotrophic fungi
(c) Plants, like *Sarracenia*
(d) Both (a) and (b)

15. Chrysophytes are
(a) planktons (b) nektons
(c) benthic organisms (d) rooted submerged.

16. Eukaryotic, achlorophyllous and heterotrophic organisms are grouped under which of the following kingdoms?
(a) Monera (b) Protista
(c) Fungi (d) Plantae

17. Virion is
(a) nulceic acid of virus
(b) antiviral agent
(c) protein of virus
(d) completely assembled virus outside host.

18. In the five-kingdom system of classification, which single kingdom out of the following can include blue, green algae, nitrogen-fixing bacteria and methanogenic archaebacteria?
(a) Fungi (b) Plantae
(c) Protista (d) Monera

19. Viruses that infect bacteria, multiply and cause their lysis, are called
(a) Lysozymes (b) Lipolytic
(c) Lytic (d) Lysogenic

20. Phenetic classification of organisms is based on
(a) Observable characteristics of existing organisms
(b) The ancestral lineage of existing organisms
(c) Dendogram based on DNA characteristics
(d) Sexual characteristics

21. The practical purpose of classification of living organisms is to
(a) explain the origin of living organisms
(b) trace the evolution of living organisms
(c) name the living organisms
(d) facilitate identification of unknown organisms

RESPONSE GRID					
	6. (a)(b)(c)(d)	**7.** (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)
	11. (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)
	16. (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)
	21. (a)(b)(c)(d)				

Space for Rough Work

22. A system of classification in which a large number of traits are considered, is
(a) artificial system (b) synthetic system
(c) natural system (d) phylogenetic system

23. In five kingdom system, the main basis of classification is
(a) structure of nucleus (b) mode of nutrition
(c) structure of cell wall (d) asexual reproduction

24. Phenetic classification is based on
(a) Sexual characteristics
(b) The ancestral lineage of existing organisms
(c) Observable characteristics of existing organisms
(d) Dendograms based on DNA characteristics

25. In which kingdom would you classify the archaebecteria and nitrogen-fixing organisms. If the five-kingdom system of classification is used ?
(a) Monera (b) Plantae
(c) Fungi (d) Protista

26. Which of the following statements is not true for retroviruses?
(a) DNA is not present at any stage in the life cycle of retroviruses
(b) Retroviruses carry gene for RNA-dependent DNA polymerase
(c) The genetic material in mature retroviruses is RNA
(d) Retroviruses are causative agents for certain kinds of cancer in man

27. On how many criteria living organisms have been classified into five kingdoms ?
(a) Two (b) Four
(c) Five (d) Three

28. First true phylogenetic system of classification was given by
(a) Eichler (b) Engler and Prantl
(c) de Jussiaeu (d) de Candolle

29. Which of the following is not a protist ?
(a) *Taenia* (b) *Amoeba*
(c) *Paramecium* (d) *Euglena*

30. Which of the following is not correctly matched?
(a) Root knot disease - *Meloidogyne javanica*
(b) Smut of bajra - *Tolysporium penicillariae*
(c) Covered smut of barley - *Ustilago nuda*
(d) Late blight of potato - *Phytophthora infestans*

31. Which one of the following character was not used by R.H. Whittaker for biological classification ?
(a) Cell structure
(b) Physiological characters
(c) Thallus organisation
(d) Phylogenetic relationships

32. The first organisms to appear on earth were
(a) photoautotrophs (b) chemoautotrophs
(c) chemoheterotrophs (d) heterotrophs

33. 'Comma' shaped bacteria are known as
(a) coccus (b) spiral
(c) spirillum (d) vibrio

34. Slime moulds in the division myxomycota (true slime moulds) have
(a) pseudoplasmodia.
(b) spores that develop into free living amoeboid cells.
(c) spores that develop into flagellated gametes.
(d) feeding stages consisting of solitary individual cells.

35. Which one of the following statements about Mycoplasma is wrong ?
(a) They are pleomorphic.
(b) They are sensitive to penicillin.
(c) They cause diseases in plants.
(d) They are also called (Pleuro pneumonia like organisms) PPLO.

36. African sleeping sickness is due to
(a) *Plasmodium vivax* transmitted by Tse-tse fly
(b) *Trypanosoma lewsii* transmitted by Bed Bug
(c) *Trypanosoma gambiense* transmitted by *Glossina palpalis*
(d) *Entamoeba gingivalis* spread by Housefly

RESPONSE GRID					
	22. ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ
	27. ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ

Space for Rough Work

37. Which one single organism or the pair of organisms is **correctly** assigned to its taxonomic group?
(a) *Paramecium* and *Plasmodium* belong to the same kingdom as that of *Penicillium*
(b) Lichen is a composite organism formed from the symbiotic association of an algae and a protozoan
(c) Yeast used in making bread and beer is a fungus
(d) *Nostoc* and *Anabaena* are examples of protista

38. Two animals which are the members of the same order must also be the members of the same :
(a) Class (b) Family
(c) Genus (d) Species

39. Bacteria lack alternation of generation because there is
(a) neither syngamy nor reduction division.
(b) distinct chromosomes are absent.
(c) no conjugation.
(d) no exchange of genetic material.

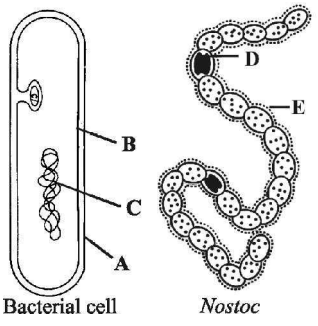
40. Capsid is
(a) genetic material of virus
(b) protein cover of virus
(c) extra genetic material of bacterium
(d) house keeping genome of bacterium

41. A group of fungi with septate mycelium in which sexual reproduction is either unknown or lacking are classified under
(a) phycomycetes (b) deuteromycetes
(c) ascomycetes (d) basidiomycetes

42. A few organisms are known to grow and multiply at temperatures of 100–105ºC. They belong to
(a) marine archaebacteria
(b) thermophilic sulphur bacteria
(c) blue-green algae (cyanobacteria)
(d) thermophilic, subaerial fungi

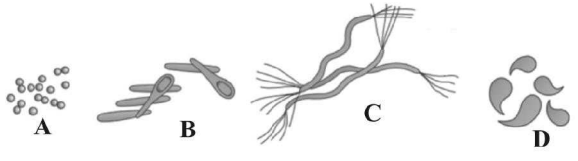
43. Mycoplasma is pleuromorphic due to
(a) absence of cell wall
(b) presence of three layered cell membrane
(c) the presence of sterol
(d) None of these

44. Refer to the given figures of bacteria cell and *Nostoc* and choose the option which shows correct label for the structures marked as A, B, C, D and E ?



(a) A – Cell wall, B – Cell membrane, C – Heterocyst, D – DNA, E – Mucilagenous sheath
(b) A – Cell wall, B – Cell membrane, C – DNA, D – Heterocyst, E – Mucilagenous sheath
(c) A – Mucilagenous sheath, B – Cell membrane, C – DNA, D – Heterocyst, E – Cell wall
(d) A – Cell membrane, B – Cell wall, C – DNA, D – Heterocyst, E – Mucilagenous sheath

45. Choose the correct names of the different bacteria given below according to their shapes.



(a) A – Cocci, B – Bacilli, C – Spirilla, D – Vibrio
(b) A – Bacilli, B – Cocci, C – Spirilla, D – Vibrio
(c) A – Spirilla, B – Bacilli, C – Cocci, D – Vibrio
(d) A – Spirilla, B – Vibrio, C – Cocci, D – Bacilli

RESPONSE GRID					
	37. ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ
	42. ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 2 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB03

SYLLABUS : Plant Kingdom

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Floridean starch is found in
(a) Chlorophyceae
(b) Rhodophyceae
(c) Phaeophyceae
(d) Cyanophyceae

2. Peat moss is another name of
(a) *Sphagnum* (b) *Marchantia*
(c) *Riccia* (d) *Dryopteris*

3. Pteridophytes differ from mosses/bryophytes in possessing
(a) independent gametophyte
(b) well developed vascular system
(c) archegonia structure
(d) flagellate spermatozoids

4. Most plants are green in colour because
(a) the atmosphere filters out all the colours of the visible light spectrum except green.
(b) green light is the most effective wavelength region of the visible spectrum in sunlight for photosynthesis.
(c) chlorophyll is least effective in absorbing green light.
(d) green light allows maximum photosynthesis.

5. In Chlorophyceae, sexual reproduction occurs by
(a) isogamy and anisogamy
(b) isogamy, anisogamy and oogamy
(c) oogamy only
(d) anisogamy and oogamy

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

6. A water fern which is used as a green manure in rice fields is
(a) *Salvinia* (b) *Mucor*
(c) *Aspergillus* (d) *Azolla*

7. The largest flower found is known as
(a) *Rafflesia* (b) *Tecoma*
(c) *Musa* (d) Cauliflower

8. In fern, spores are formed in
(a) sporangium (b) oogonium
(c) archegonium (d) stomium

9. *Laminaria* (kelp) and *Fucus* (rock weed) are the examples of
(a) red algae
(b) brown algae
(c) green algae
(d) golden brown algae

10. People recovering from long illness are often advised to include the alga *Spirulina* in their diet because it
(a) makes the food easy to digest.
(b) is rich in proteins.
(c) has antibiotic properties.
(d) restores the intestinal microflora.

11. Which of the following cell organelle remains enveloped by a single unit membrane?
(a) Mitochondria (b) Lysosomes
(c) Nucleus (d) Chloroplast

12. Consider the following statements regarding the major pigments and stored food in the different groups of algae and choose the correct option.
(i) In Chlorophyceae, the stored food material is starch and the major pigments are chlorophyll-*a* and *d*.
(ii) In Phaeophyceae, laminarin is the stored food and major pigments are chlorophyll-*a* and *b*.
(iii) In Rhodophyceae, floridean starch is the stored food and the major pigments are chlorophyll-*a*, *d* and phycoerythrin.
(a) (i) is correct, but (ii) and (iii) are wrong.
(b) (i) and (ii) are correct, but (iii) is wrong.
(c) (i) and (iii) are correct, but (ii) is wrong.
(d) (iii) is correct, but (i) and (ii) are wrong.

13. Algae have cell wall made up of
(a) cellulose, galactans and mannans
(b) hemicellulose, pectins and proteins
(c) pectins, cellulose and proteins
(d) cellulose, hemicellulose and pectins.

14. Which plays an important role in the dispersal of spores in *Funaria*?
(a) Operculum
(b) Capsule
(c) Peristome and annulus
(d) Sporogonium

15. Read the following five statements (i – v) and answer the question.
(i) In *Equisetum* the female gametophyte is retained on the parent sporophyte.
(ii) In *Ginkgo* male gametophyte is not independent.
(iii) The sporophyte in *Riccia* is more developed than that in *Polytrichum.*
(iv) Sexual reproduction in *Volvox* is isogamous.
(v) The spores of slime molds lack cell walls.
How many of the above statements are correct?
(a) Two (b) Three
(c) Four (d) One

16. Which one of the following is common to multicellular fungi, filamentous algae and protonema of mosses?
(a) Diplontic life cycle
(b) Members of kingdom plantae
(c) Mode of Nutrition
(d) Multiplication by fragmentation

17. Which one of the following is a correct statement ?
(a) Pteridophyte gametophyte has a protonemal and leafy stage
(b) In gymnosperms female gametophyte is free-living
(c) Antheridiophores and archegoniophores are present in pteridophytes
(d) Origin of seed habit can be traced in pteridophytes

RESPONSE GRID					
	6. (a)(b)(c)(d)	**7.** (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)
	11. (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)
	16. (a)(b)(c)(d)	**17.** (a)(b)(c)(d)			

Space for Rough Work

18. What is the similarity between gymnosperms and angiosperms ?
(a) Phloem of both have companian cells.
(b) Endosperm is formed before fertilization in both.
(c) Origin of ovule and seed is similar in both.
(d) Both have leaves, stem and roots.

19. In Chlorophyceae, sexual reproduction occurs by
(a) isogamy and anisogamy
(b) isogamy, anisogamy and oogamy
(c) oogamy only
(d) anisogamy and oogamy

20. In gymnosperms, the ovule is naked because
(a) ovary wall is absent (b) integuments are absent
(c) perianth is absent (d) nucellus is absent

21. How many meiotic division would be required to produce 101 female gametophytes in an angiosperm?
(a) 101 (b) 26
(c) 127 (d) None of these

22. Which one of the following is the major difference between mosses and ferns ?
(a) Ferns lack alternation of generation while mosses show the same.
(b) Mosses are facultative aerobes while ferns are obligate aerobes.
(c) Vascular bundles of ferns show xylem vessels while those of mosses lack it.
(d) Sporophytes of ferns live much longer as compared to the sporophytes of mosses.

23. Red snow causing alga is
(a) *Chlamydomonas nivalis*
(b) *Chlamydomonas reinhardtii*
(c) *Chlamydomonas debaryanum*
(d) *Chalmydomonas media*

24. Alginates (alginin), used as highly efficient gauze in internal operations are obtained from cell walls of
(a) Cyanophyceae (b) Phaeophyceae
(c) Rhodophyceae (d) All of these

25. Bryophytes resemble algae in the following aspects
(a) Filamentous body, presence of vascular tissues and autotrophic nutrition
(b) Differentiation of plant body into root, stem and leaves and autotrophic nutrition
(c) Thallus like plant body, presence of root and autotrophic nutrition
(d) Thallus like plant body, lack of vascular tissues and autotrophic nutrition

26. In sexual life cycle of *Agaricus*, dikaryotization (n + n) is brought about by
(a) Fusion of male and female sex organs
(b) Fusion of vegetative cells of different genotypes
(c) Somatogamy between basidiospores
(d) Fusion of motile gametes

27. Read the following features properly
A. Free living
B. Mostly photosynthetic
C. Mostly parasitic
D. Inconspicuous
E. Unicellular
How many of the given features are correct for prothallus of pteridophytes?
(a) Three (b) Five
(c) Four (d) Two

28. Identify the correctly matched pair:

	Class	Example	Feature
(a)	Psilopsida	*Lycopodium*	Seed habit
(b)	Sphenopsida	*Selaginella*	Strobilus
(c)	Lycopsida	*Psilotum*	Homosporous
(d)	Pteropsida	*Dryopteris*	Macrophylls

29. Angiosperms have dominated the land flora primarily because of their
(a) power of adaptability in diverse habitat
(b) property of producing large number of seeds
(c) nature of self pollination
(d) domestication by man

RESPONSE GRID					
	18. ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ
	23. ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ
	28. ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ			

Space for Rough Work

30. Which out of the following are included under tracheophyta i.e., vascular plants?
(a) Pteridophytes (b) Gymnosperms
(c) Angiosperms (d) All of these

31. At least a half of the total CO_2 fixation on earth is carried out through photosynthesis by
(a) angiosperms (b) gymnosperms
(c) algae (d) bryophytes

32. The embryonic development in bryophytes takes place in the
(a) protonema (b) sporangium
(c) antheridium (d) archegonium.

33. The spread of living pteridophytes is limited and is restricted to narrow geographical region because of
(a) gametophytic growth needs cool, damp and shady places
(b) requirement of water for fertilization
(c) absence of stomata in leaf and absence of vascular tissue
(d) both (a) and (b)

34. Gymnosperm called as a living fossil is
(a) *Cycas* (b) *Ginkgo*
(c) *Juniperus* (d) Both (a) and (b).

35. The sporophyte is the dominant phase in
(a) pteridophytes (b) gymnosperms
(c) angiosperms (d) all of these.

36. Which kind of life-cycle pattern is exhibited by seed-bearing plants?
(a) Haplontic (b) Diplontic
(c) Haplo-diplontic (d) All of these

37. Plants reproducing by spores such as mosses and ferns are grouped under the general term
(a) Thallophytes (b) Cryptogams
(c) Bryophytes (d) Sporophytes

38. Angiosperms have dominated the land flora primarily because of their
(a) Power of adaptability in diverse habitat
(b) Property of producing large number of seeds
(c) Nature of self pollination
(d) Domestication by man

39. Many blue-green algae occur in thermal springs (hot water springs). The temperature tolerance of these algae have been attributed to their
(a) cell wall structure
(b) mitochondrial structure
(c) modern cell organization
(d) importance of homopolar bonds in their proteins

40. Which of the following occurs both in fresh as well as in marine water ?
(a) Spirogyra (b) *Cladophora*
(c) Oedogonium (d) *Cephaleuros*

41. The pyrenoids are made up of
(a) proteinaceous centre and starchy sheath
(b) core of protein surrounded by fatty sheath
(c) core of starch surrounded by sheath of protein
(d) core of nucleic acid surrounded by protein sheath

42. Blue green algae have
(a) chlorophyll (b) xanthyophyll
(c) phycocyanin (d) fucoxanthin

43. Parasitic alga is
(a) *Volvox* (b) Ulothrix
(c) *Porphyra* (d) *Cephaleuros*

44. Which one of the following pairs of plants are not seed producers?
(a) *Funaria* and *Pinus* (b) Fern and *Funaria*
(c) *Funaria* and *Ficus* (d) *Ficus* and *Chlamydomonas*

45. Neck canal cells are absent in archegonia of –
(a) Bryophytes (b) Gymnosperms
(c) Pteridophytes (d) All of these

RESPONSE GRID					
	30. (a)(b)(c)(d)	**31.** (a)(b)(c)(d)	**32.** (a)(b)(c)(d)	**33.** (a)(b)(c)(d)	**34.** (a)(b)(c)(d)
	35. (a)(b)(c)(d)	**36.** (a)(b)(c)(d)	**37.** (a)(b)(c)(d)	**38.** (a)(b)(c)(d)	**39.** (a)(b)(c)(d)
	40. (a)(b)(c)(d)	**41.** (a)(b)(c)(d)	**42.** (a)(b)(c)(d)	**43.** (a)(b)(c)(d)	**44.** (a)(b)(c)(d)
	45. (a)(b)(c)(d)				

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 3 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	35	Qualifying Score	50
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB04

SYLLABUS : Animal Kingdom

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Classification of Porifera is based on
(a) branching (b) spicules
(c) reproduction (d) symmetry

2. A chordate character is
(a) gills (b) spiracles
(c) postanal tail (d) chitinous exoskeleton

3. Which one of the following pairs of animals comprises 'jawless fishes'?
(a) Mackerals and Rohu (b) Lampreys and hag fishes
(c) Guppies and hag fishes (d) Lampreys and eels

4. Leech is
(a) carnivorous (b) sanguivorous
(c) ectoparasite (d) Both (b) and (c)

5. Which one of the following groups of animals is bilaterally symmetrical and triploblastic?
(a) Aschelminthes (round worms)
(b) Ctenophores
(c) Sponges
(d) Coelenterates (Cnidarians)

6. Which of the following animal is cold blooded and has 4 - chambered heart?
(a) Salamander (b) *Ornithorhynchus*
(c) Crocodile (d) *Calotes*

7. Which one of the following is NOT a characteristic of phylum Annelida?
(a) Closed circulatory system
(b) Segmentation
(c) Pseudocoelom
(d) Ventral nerve cord

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ			

Space for Rough Work

8. Which one of the following characters is not typical of the class mammalia?
(a) Thecodont dentition
(b) Alveolar lungs
(c) Ten pairs of cranial nerves
(d) Seven cervical vertebrae

9. Which one of following feature is possessed by Crustaceans and not by insects?
(a) Paired limbs
(b) Two pairs of antenna
(c) Chitinous exoskeleton
(d) Bilateral symmetry

10. Poison glands of snake are modified
(a) Linguals (b) Sublinguals
(c) Maxillaries (d) Parotids

11. The adults are radially symmetrical but larvae exhibit bilateral symmetry in
(a) Mollusca (b) Hemichordata
(c) Echinodermata (d) Cephalochordata

12. Which one of the following categories of animals, is correctly described with no single exception in it?
(a) All sponges are marine and have collared cells.
(b) All mammals are viviparous and possess diaphragm for breathing.
(c) All bony fishes have four pairs of gills and an operculum on each side.
(d) All reptiles possess scales, have a three chambered heart and are cold blooded (poikilothermal).

13. Solenocytes and metanephridia are excretory organs of
(a) Annelida and Arthropoda
(b) Platyhelminthes and Annelida
(c) Coelenterata and Mollusca
(d) Aschelminthes and Annelida

14. Radial symmetry occurs in
(a) Porifera and Coelenterata
(b) Coelenterata and Echinodermata
(c) Coelenterata and Platyhelminthes
(d) Arthropoda and Mollusca

15. Which of the following statements is/are not true?
(i) In Urochordata, notochord is present in larval tail.
(ii) In Cephalochordata, notochord extends from head to tail region.
(iii) *Branchiostoma* belongs to hemichordata.
(iv) Only one class of living members, class Cyclostomata represents the super class agnatha
(a) (ii) and (iv) (b) (i), (iii) and (iv)
(c) (iii) only (d) (i) and (iv)

16. In *Amoeba* and *Paramecium* osmoregulation occurs through
(a) pseudopodia (b) nucleus
(c) contractile vacuole (d) general surface

17. Animals with metameric segmentation, bilateral symmetry and closed circulatory system belong to phylum
(a) Annelida (b) Echinodermata
(c) Arthropoda (d) Mollusca

18. Which one of the following characters is **not** typical of the class Mammalia?
(a) Thecodont dentition
(b) Alveolar lungs
(c) Ten pairs of cranial nerves
(d) Seven cervical vertebrae

19. The segments of earthworms are
(a) Apparent in the embryo but not in the adult
(b) Specialised for different functions and are present in endoderm only
(c) Present in mesoderm but not in the ectoderm
(d) Repetitive, with serial repetition of at least some organs

20. The evolution of an internal body cavity/coelom offered an advantage in animal body design in all areas, except
(a) Evolution of effecient organ systems
(b) Provides space within which the gonads can expand and large number of gametes stored
(c) Circulation
(d) Greater freedom of movement

RESPONSE GRID					
	8. ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ
	13. ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ
	18. ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ		

Space for Rough Work

21. Animals like bats have/are
(a) Hollow skeleton
(b) Feathers which are modified reptilian scales
(c) Endothermic
(d) Efficient respiration. Non-vascular air sacs are connected to lungs to supplement respiration

22. Which of the following is incorrect match of animal group/life style/structure/function?

	Animal	Lifestyle	Structure/functions group
(a)	Sponges	Sessile filter feeders	Amoebocytes/carry food and wastes Spicules/support and protection spongin / support
(b)	Cnidarians	Free floating or attached	Gastrovascular cavity/digestion Cnidocytes/ protection and food getting
(c)	Flatworms	Free living or parasite	Flame cells/ excretion Tegument/ protection
(d)	Molluscs	Terrestrial, marine, fresh water inhabitants	Radula/feeding mantle/motility

23. Complete the following analogy : Pigeon's milk : Crop :: Song :
(a) Syrinx (b) Trachea
(c) Proventriculus (d) Anterior air sacs

24. Which of the following is not correct matching of phylum and its three examples?
(a) Annelida : *Aphrodite, Chaetopterus, Bonnelia*
(b) Mollusca : *Teredo, Aplysia, Chaetopleura*
(c) Aschelminthes : *Ancylostoma, Enterobius, Tubifex*
(d) Arthropoda : *Buthus, Lepisma, Leptocorisa*

25. Hemichordates differ from chordates, in that hemichordates
(a) Are gill breathers
(b) Fertilisation is external and development is indirect
(c) Do not possess notochord
(d) Are bilaterally symmetrical, triploblastic and coelomate animals

26. All birds have
(a) Oil gland at the base of tail
(b) Feather on their body and can fly
(c) Nests to care their babies
(d) Internal fertilization, are oviparous and eggs are covered with calcareous shell

27. Which one of the following is a coelenterate?
(a) Sea mouse (b) Sea anemone
(c) Sea urchin (d) Sea cucumber

28. Presence of external ear pinna, body hairs, four chambered heart are the characters of
(a) *Macropus* (b) *Balaenoptera*
(c) *Psittacula* (d) *Aptenodytes*

29. Which one of the following statements about certain given animals is correct?
(a) Round worms are pseudo-coelomates
(b) Molluscs are acoelomates
(c) Insects are pseudo-coelomates
(d) Flatworms are coelomates

30. Which one of the following phyla is correctly matched with its two general characteristics?
(a) Echinodermata – pentamerous radial symmetry and mostly internal fertilization
(b) Mollusca – normally oviparous and development through a trochophore or veliger larva
(c) Arthropoda – body divided into head, thorax and abdomen and respiration by mouth
(d) Chordata – notochord persists throughout and separate anal and urinary openings to the outside

31. Amphibians share with reptiles all of the following characters expect
(a) ventral heart
(b) external fertilization and indirect development
(c) dioecious, oviparous
(d) cold blooded or poikilotherms.

RESPONSE GRID					
	21. ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ
	26. ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ
	31. ⓐⓑⓒⓓ				

Space for Rough Work

32. Which of the following statements about the body cavity of animals is true ?
(a) The body cavity of coelomates develops from the embryonic ectoderm.
(b) The acoelomates' body cavity is filled with liquid.
(c) The pseudocoel of the pseudocoelomates have a peritoneum.
(d) The acoelomates do not have an enclosed body cavity.

33. Sponges have a very simple body plan. Which of the following statements about sponge structure or function is false ?
(a) Choanocytes are flagellated cells that play a role in feeding.
(b) Large species are found in areas of heavy wave action, where food is most abundant.
(c) Individual sponges are both male and female.
(d) Water enters a sponge through pores and exits via one or more oscula.

34. Which of the following traits is not shared by the Ctenophora and the Cnidaria ?
(a) Both are diploblastic
(b) Both have radial symmetry
(c) Both have complete guts.
(d) Both have feeding tentacles.

35. Earthworm has
(a) Two eyes (b) Many eyes
(c) No eyes (d) One eye.

36. Which of the following statements is not true of the Rotifera ?
(a) They have a complete gut with an anterior mouth and posterior anus.
(b) They are coelomates
(c) The corona is a ciliated organ used in acquiring food.
(d) They use a hydrostatic skeleton.

37. The combination of a true coelom and repeating body segmentation allows the annelids (unlike the anatomically "simpler" worms) to do which of the following ?
(a) Attain complex body shapes and thus locomote more precisely
(b) Move through loose marine sediments
(c) Be hermaphroditic
(d) Inject paralytic poisons into their prey

38. An animal is divided along its main body axis to produce similar halves. Which of the following types of symmetry could apply ?
(a) Spherical (b) Radial
(c) Radial or biradial (d) Bilateral

39. Cephalization is a characteristic mainly associated with which of the following types of body symmetry in animals ?
(a) Asymmetric (b) Radial
(c) Biradial (d) Bilateral

40. Amphids present on ventrolateral lips of *Ascaris* are
(a) Chemoreceptors (b) Olfactoreceptors
(c) Tactoreceptors (d) Gustatoreceptors

41. Corals are common representatives of the cnidarian class_____ .
(a) Scyphozoa (b) Anthozoa
(c) Porifera (d) Placozoa

42. Which of the following characteristics is unique to the phylum Cnidaria ?
(a) Sexual reproduction
(b) Symbiotic associations with other organisms
(c) Sedentary body forms
(d) Nematocysts

43. Which of the following statements is true of all flatworms ?
(a) Flatworms are biradially symmetric
(b) Flatworms have a complete digestive system
(c) Flatworms tend to have large, thickened bodies
(d) Flatworms are triploblastic

44. Which of the following structures is absent from a typical gastropod mollusk (e.g., a garden snail) ?
(a) Protective shell (b) Head
(c) Radula (d) None of these

45. Which two of the following are found in the mesophyl or protein matrix and serve as structural support for a sponge ?
(a) spicule, spongin (b) osculum, spicule
(c) medusa, polyp (d) polyp, osculum

RESPONSE GRID					
	32. (a)(b)(c)(d)	**33.** (a)(b)(c)(d)	**34.** (a)(b)(c)(d)	**35.** (a)(b)(c)(d)	**36.** (a)(b)(c)(d)
	37. (a)(b)(c)(d)	**38.** (a)(b)(c)(d)	**39.** (a)(b)(c)(d)	**40.** (a)(b)(c)(d)	**41.** (a)(b)(c)(d)
	42. (a)(b)(c)(d)	**43.** (a)(b)(c)(d)	**44.** (a)(b)(c)(d)	**45.** (a)(b)(c)(d)	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 4 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	65
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB05

SYLLABUS : Morphology of Flowering Plants

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which one of the following is a true fruit?
(a) Apple (b) Pear
(c) Cashew nut (d) Coconut

2. Pulses are belong to the family
(a) fabaceae (b) asteraceae
(c) poaceae (d) solanaceae

3. In a cereal grain the single cotyledon of embryo is represented by
(a) scutellum (b) prophyll
(c) coleoptile (d) coleorrhiza

4. Perisperm is
(a) remnant of endosperm
(b) persistant nucellus
(c) remnant of embryo
(d) part of endosperm

5. The mode of catching insects in *Drosera* plants is by means of
(a) sensitive glandular hairs which secrete a sweet, viscous, shining substance.
(b) specially sensitive trigger hairs.
(c) leaves which are modified into pitcher.
(d) leaf segments modified into bladder.

6. Insectivorous plants grow in
(a) calcium deficient soil
(b) carbon deficient soil
(c) magnesium deficient soil
(d) nitrogen deficient soil

7. Which part of the coconut produces coir?
(a) Seed coat (b) Mesocarp
(c) Epicarp (d) Pericarp

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ			

Space for Rough Work

8. Pineapple (ananas) fruit develops from
(a) a multipistillate syncarpous flower
(b) a cluster of compactly borne flowers on a common axis
(c) a multilocular monocarpellary flower
(d) a unilocular polycarpellary flower

9. Scutellum is a/an
(a) protective covering of radicle
(b) protective covering of plumule
(c) endosperm of gymnosperms
(d) shield-shaped cotyledon

10. Fibrous root system is better adopted than tap root system for
(a) transport of organic matter
(b) absorption of water and minerals
(c) storage of food
(d) anchorage of plant to soil

11. Velamen is found in
(a) roots of screwpine
(b) aerial and terrestrial roots of orchids
(c) leaves of *Ficus elastica*
(d) only aerial roots of orchids

12. Hypanthodium is
(a) thalamus (b) fruit
(c) inflorescence (d) ovary

13. Which of the following statement (s) is/are incorrect?
(i) Calyx and corolla are reproductive organs of a flower.
(ii) Zygomorphic flower can be divided into two equal radial halves in any radial plane.
(iii) Flowers without bracts are termed as bracteate.
(iv) Parthenocarpic fruit is formed after fertilization of the ovary.
(v) In legumes, seed is non-endospermic.
(vi) Radical buds develop on roots.
(a) (i), (ii), (iii) and (iv) (b) (i), (ii) and (v)
(c) (iii), (iv) and (vi) (d) (i), (iv) and (v)

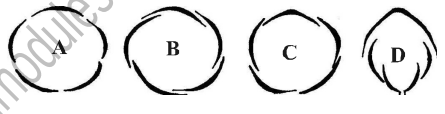
14. Milky water of green coconut is
(a) liquid nucellus
(b) liquid of female gametophyte
(c) liquid endosperm
(d) liquid embryo

15. Clove is
(a) flower bud (b) axillary bud
(c) thalamus (d) ovule

16. When gynoecium is present in the top most position of thalamus, the flower is known as
(a) inferior (b) epigynous
(c) perigynous (d) hypogynous

17. Which is not a stem modification ?
(a) Rhizome of ginger (b) Corm of *Colocasia*
(c) Pitcher of *Nepenthes* (d) Tuber of potato

18. Which option is correctly matched with the diagrams?

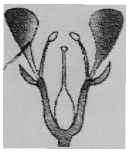
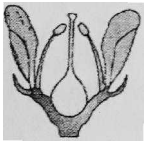
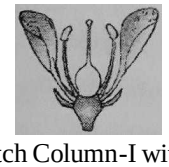


(a) A-Valvate B-Twisted, C-Imbricate, D-Vexillary
(b) A-Vexillary, B-Valvate, C-Twisted, D-Imbricate
(c) A-Imbricate, B-Vexillary, C-Valvate, D-Twisted
(d) A-Twisted, B-Imbricate, C-Vexillary, D-Valvate

RESPONSE GRID					
	8. (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)
	13. (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)
	18. (a)(b)(c)(d)				

Space for Rough Work

19. Given below are the diagrammatic representation of position of floral parts on thalamus, condition of ovary and example. Find the correctly matched combination?

	Position of floral parts on thalamus	Condition of ovary	Example
(a)		$\overline{G}$	Cucumber
(b)		G–	Brinjal
(c)		G	Plum
(d)		$\overline{G}$	Rose

20. Match Column-I with Column-II and select the correct option from the codes given below.

	Column-I		Column-II
A.	Thorns	I.	Vegetative propagation
B.	Phylloclades	II.	Defensive mechanism
C.	Runners	III.	Mechanical support
D.	Stilt roots	IV.	Absorption of nutrition
E.	Haustoria	V.	Photosynthesis

(a) A-I; B-IV; C-III; D-II; E-I
(b) A-II; B-V; C-III; D-I; E-IV
(c) A-II; B-V; C-I; D-III; E-IV
(d) A-III; B-V; C-IV; D-I; E-II

21. Maize grain is a fruit known as
(a) cypsela (b) caryopsis
(c) legume (d) achene

22. Monocotyledonous root differs from dicot root in which of the following internal features (a to d)?
(a) Presence of parenchymatous pericycle.
(b) Absence of fewre xylem bundle.
(c) Presence of large and well-developed pith.
(d) Presence of parenchymatous cortex without intercellular spaces.

23. Select correct match w.r.t column I & II.

	Column I		Column II
A.	Modified tap root for respiration	I.	Zea mays
B.	Storage tap root	II.	ipomoea
C.	Modified aventitious root for mechanical support	III.	Rhizophora
D.	Modified adventitious root for food storge	IV.	Turnip

(a) A-III; B-IV; C-I; D-II
(b) A-III; B-IV; C-II; D-I
(c) A-IV; B-II; C-I; D-III
(d) A-III; B-II; C-I; D-IV

24. The modified stem in some plants of arid region is
(a) Tendril for climbring as in *Passiflora*
(b) Spines for defence mechanism
(c) Phylloclade for food synthesis
(d) Phyllode for food synthesis

25. The modified stem in grasses, strawberry and *Crysanthemum* is concerned with special functions i.e.,
i. Food storage
ii. Vegetative propagation
iii. Assimilation
iv. Spread to new niches
v. Perennation
(a) ii, iv (b) i, ii, v
(c) ii, iv, v (d) iii, iv, v

RESPONSE GRID					
	19. ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ
	24. ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ			

Space for Rough Work

26. In which of the following type of flowers stamens are superior in position?
(a) Hypogynous (b) Perigynous
(c) Epigynous (d) Protogynous

27. Inner layer of pericarp is hard and stony in
(a) Dateplam, Almond (b) Wood, apple, Pea
(c) Mango, Coconut (d) Pear, Litchi

28. Find out the incorrect match.
(a) Sterile stamen – Staminode
(b) Stamens attached to petals – Epipetalous
(c) Stamens attached to perianth – Episepalous
(d) Free stamens – Polyandrous

29. Ovary is said to be half inferior in which of the following conditions?
(a) Hypogynous (b) Perigynous
(c) Epigynous (d) Both (b) and (c)

30. Identify the family which shows the following diagnostic features.
Flowers pentamerous, gynoecium-bicarpellary, syncarpous, ovary placed obliquely, placentation axile, placenta swollen.
(a) Solanaceae (b) Le guminosae
(c) Papilionaceae (d) Liliaceae

31. Select the pair which contains monocotyledonous families.
(a) Solanaceae and Brassicaceae
(b) Fabaceae and Asteraceae
(c) Liliaceae and Poaceae
(d) None of these

32. In Nepenthes (pitcher plant), the pitcher is formed due to modification of
(a) leaf petiole (b) leaf lamina
(c) tendril (d) leaflet

33. Example for tuberous adventitious roots
(a) Dahlia (b) Carrot
(c) Radish (d) Beet

34. A root-cap is usually absent in the roots of
(a) Hydrophytes (b) Epiphytes
(c) Parasites (d) All of the above

35. An example of negatively geotropic root
(a) Coralloid root of *Cycas*
(b) Pneumatophore of mangroves
(c) Assimilatory roots *of Trapa*
(d) More than one of the above.

36. *Santalum album* is normally considered as a
(a) Complete root parasite
(b) Partial root parasite
(c) Complete stem parasite
(d) Partial stem parasite

37. An example of tuberous root that is a modification of tap foot
(a) Radish (b) *Mirabilis*
(c) Sweet Potato (d) *Ipomoea*

38. Ginger is a stem and not a root because
(a) It stores food
(b) It is bitter in taste
(c) It has nodes and internodes
(d) It is non-green in colour.

39. In *Allium*, the leafless part of the stem which bears flower is called
(a) Culm (b) Scape (c) Caudex (d) Bulb

40. Sweet Potato is a modification of
(a) Root (b) Stem
(c) Bud (d) Flowering axis

41. Epiphyllous buds serve the function of
(a) Respiration (b) Nutrition
(c) Reproduction (d) Absorption

42. In a potato plant the tubers develop on
(a) Primary root (b) Secondary root
(c) Tertiary root (d) Stolon

43. Root is the prolongation of
(a) Plumule (b) Radicle
(c) Stem (d) Branches

44. Food stored in a bulb is within
(a) A swollen stem (b) Swollen leaf-bases
(c) Enlarged roots (d) In the inflorescence

45. Cladode is the modification of
(a) Whole stem (b) Axillary bud
(c) Leaf (d) Leaflets.

RESPONSE GRID					
	26. ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ
	31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 5 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB06

SYLLABUS : Anatomy of Flowering Plants

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. During formation of leaves and elongation of stem, some cells ' left behind' from the shoot apical meristem, constitute ____
(a) Lateral meristem (b) Axillary bud
(c) Cork cambium (d) Fascicular cambium

2. Function of companion cells is
(a) providing energy to sieve elements for active transport.
(b) providing water to phloem.
(c) loading of sucrose into sieve elements by passive transport.
(d) loading of sucrose into sieve elements.

3. The cork cambium, cork and secondary cortex are collectively called
(a) phelloderm (b) phellogen
(c) periderm (d) phellem

4. Which of the following does not have stomata ?
(a) Hydrophytes (b) Mesophytes
(c) Xerophytes (d) Submerged hydrophytes

5. The chief water conducting elements of xylem in gymnosperms are :
(a) vessels (b) fibres
(c) transfusion tissue (d) tracheids

6. Which is correct about transport or conduction of substances?
(a) Organic food moves up through phloem.
(b) Organic food moves up through phloem
(c) Inorganic food moves upwardly and downwardly through xylem
(d) Organic food moves upwardly and downwardly through phloem

RESPONSE GRID	1. ⓐⓑⓒⓓ 2. ⓐⓑⓒⓓ 3. ⓐⓑⓒⓓ 4. ⓐⓑⓒⓓ 5. ⓐⓑⓒⓓ 6. ⓐⓑⓒⓓ

Space for Rough Work

7. A narrow layer of thin walled cells found between phloem/ bark and wood of a dicot is
(a) cork cambium (b) vascular cambium
(c) endodermis (d) pericycle

8. Which of the following statements is true?
(a) Vessels are multicellular with narrow lumen.
(b) Tracheids are multicellular with narrow lumen.
(c) Vessels are unicellular with wide lumen.
(d) Tracheids are unicellular with wide lumen.

9. The quiescent centre in root meristem serves as a
(a) site for storage of food which is utilized during maturation.
(b) reservoir of growth hormones.
(c) reserve for replenishment of damaged cells of the meristem.
(d) region for absorption of water.

10. Root hair arises from
(a) pericycle (b) endodermis
(c) cortex (d) epiblema

11. Phellogen and phellem respectively denote
(a) cork and cork cambium
(b) cork cambium and cork
(c) secondary cortex and cork
(d) cork and secondary cortex

12. The common bottle cork is a product of :
(a) Dermatogen (b) Phellogen
(c) Xylem (d) Vascular cambium

13. A vascular bundle in which the protoxylem is pointing to the periphery is called
(a) endarch (b) exarch
(c) radial (d) closed

14. Which of the following does not have stomata?
(a) Hydrophytes
(b) Mesophytes
(c) Xerophytes
(d) Submerged hydrophytes

15. Collenchyma differs from parenchyma in having
(a) living protoplasm
(b) cellulose walls
(c) vacuoles
(d) pectin deposits at corners

16. Which of the following plant shows multiple epidermis?
(a) *Croton* (b) *Allium*
(c) *Nerium* (d) *Cucurbita*

17. Epidermis is absent in
(a) root tip and shoot tip (b) shoot bud and floral bud
(c) ovule and seed (d) petiole and pedicel

18. Which of the following layer is present nearest of plasma membrane in plant cell?
(a) Secondary wall (b) Middle lamella
(c) Primary wall (d) Tonoplast

19. Which one of the following statement is false?
(i) Epidermal cell has small amount of cytoplasm and a large vacuole.
(ii) Waxy cuticle layer is absent in roots.
(iii) Root hairs are unicellular, while stem hairs / trichomes are multicellular.
(iv) Trichomes may be branched or unbranched, soft or stiff and prevent transpiration.
(v) Guard cells are dumbell shaped in dicots and bean-shaped in monocots.
(a) (i) only (b) (iv) only
(c) (iii) only (d) (v) only

20. Which option is true about heart wood/duramen?
(i) It does not help in water and mineral conduction.
(ii) It is dark coloured but soft.
(iii) It has tracheary elements filled with tannins, resins, gums, oil, etc.
(iv) It is a peripheral part.
(v) Sensitive to microbes and insects, hence least durable.
(a) (i) and (iii) (b) (ii) and (iii)
(c) (iv) and (v) (d) (iii) and (iv)

RESPONSE GRID					
	7. (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)
	12. (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)
	17. (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	

Space for Rough Work

21. In land plants, the guard cells differ from other epidermal cells in having
(a) cytoskeleton (b) mitochondria
(c) endoplasmic reticulum (d) chloroplasts

22. Which of the following statement(s) is/are true?
(i) Uneven thickening of cell wall is characteristic of sclerenchyma.
(ii) Periblem forms cortex of the stem and the root.
(iii) Tracheids are the chief water transporting elements in gymnosperms.
(iv) Companion cell is devoid of nucleus at maturity.
(v) The Commercial cork is obtained from *Quercus suber.*
(a) (i) and (iv) only (b) (ii) and (v) only
(c) (iii) and (iv) only (d) (ii), (iii) and (v) only

23. In endarch condition of xylem, protoxylem lies _____ of metaxylem.
(a) on inner side
(b) on outer side
(c) both on inner and outer side
(d) in centre

24. Y-shaped arrangement of xylem vessels is found in
(a) monocot stem (b) dicotstem
(c) monocot root (d) dicot root

25. Study carefully the following statements and select the incorrect one(s).
(i) Lateral roots develop from pericycle.
(ii) Endodermis is the innermost layer of cortex.
(iii) Sap wood is the central, dark coloured, non-conducting part of secondary xylem
(a) (i) and (ii) (b) (ii) and (iii)
(c) (i) only (d) (iii) only

26. Removed parts of grasses by the grazing herbivores are regenerated fast by
(a) Both apical and intercalary meristems
(b) Lateral meristems only
(c) Secondary meristems
(d) Intercallary meristems

27. Which of the following statement for early wood is correct?
(a) Xylary elements having narrow vessels
(b) Darker with higher density
(c) Lighter in colour and has high density
(d) Having vessels with wider cavities

28. Choose correct option w.r.t origin and position of meristem reponsible for the regeneration of parts removed by the grazing herbivores.

	Origin	**Position**
(a)	Secondary	Lateral
(b)	Primary	Apical
(c)	Secondary	Apical
(d)	Primary	Intercalated

29. Companion cells are
(a) Thin, parrenchymatous, enucleated cells
(b) Thick, sclerenchymatous, nucleated cells
(c) Thin, parenchymatous, nucleated cells
(d) Thick, collenchymatous, enucleated cells

30. Conjoint type of vascular bundle are present in
(a) Root, stem (b) Root, leaves
(c) Stem, leaves (d) Root only

31. Activity of cambium is controlled by
(a) Physiological and environmental factors
(b) Hormonal and external factors
(c) Internal and external factors
(d) Move than one option is correct

32. Epidermal and ground tissue system are made of
(a) Meristem and simple permanet tissue
(b) Primary and secondary meristem
(c) Simple and complex permanent tissue
(d) Simple permanent tissues

RESPONSE GRID					
	21. ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ
	26. ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ
	31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ			

Space for Rough Work

33. Root region with thin-walled, small cells having dense cytoplasm is
(a) Region of cell elongation
(b) Maturation region
(c) Proximal to cell elongation zone
(d) Distal to cell elongation zone

34. Periderm includes
(a) Cork and secondary cortex
(b) Only cork cambium
(c) Cork cambium and cork only
(d) Cork, phellogen and secondary cortex

35. Choose incorrect statement from the given below
I. In dicot stem, the innemost layer of cortex is endodermis.
II. Endodermis with casparian strips is found in dicot stem.
III. In dicot stem, the cells of endodermis are rich in starch grain.
(a) I & II (b) II & III
(c) I & III (d) Only II

36. The cells which lie between xylem and phloem in dicot root are
(a) Pith rays
(b) Conjuctive tissue
(c) Interfascicular cambium
(d) Intrafascicular cambium

37. Which tissue of the dicot root is involved in the formation of vascular cambium?
(a) Pericyle part above primary phloem
(b) Whole pericycle
(c) Thich walled parenchymatous cells of pith
(d) Portion of pericycle above the protoxylem

38. Vascular bundles in dicot leaves are
(a) Conjoint, bicollateral, closed
(b) Radia, open
(c) Conjoint, collateral, closed
(d) Conjoint, collaterl, open

39. Which of the following represents the functions of veins in the leaves?
(a) Transport of water and minerals
(b) Mechanical support
(c) Transport of organic food material
(d) All of these

40. In *Cuscuta* the nodes give rise to special roots which penetrate the host tissue upto
(a) Cortex (b) Phloem
(c) Epidermis (d) Pericycle

41. A tylose is formed form :
(a) ray parenchyma
(b) inner parenchyma
(c) paratracheal parenchyma
(d) metatracheal parenchyma

42. Which of the following plant shows multiple epidermis?
(a) *Croton* (b) *Allium*
(c) *Nerium* (d) *Cucurbita*

43. In the monocot root, we obseve
(a) suberized exodermis, polyarch xylem , pith
(b) exodermis, endarch, tetarch closed bundles
(c) conjoint, collateral, open, polyarch vascular bundle
(d) suberized exodermis, casparian strip, passage cells, cambium

44. In a dicotyledonous stem, the sequence of tissues from the outside to the inside is :
(a) phellem-pericycle-endodermis-phloem
(b) phellem-phloem-endodermis-pericycle
(c) phellem-endodermis-pericycle-phloem
(d) pericycle-phellem-endodermis-phloem

45. The tunica corpus theory was proposed by :
(a) Nageli
(b) Hanstein
(c) Schmidt
(d) Haberlandt

RESPONSE GRID					
	33. ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ
	38. ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ
	43. ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ		

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 6 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB07

SYLLABUS : Structural Organisation in Animals

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. The kind of epithelium which forms the inner walls of blood vessels is
(a) cuboidal epithelium
(b) columnar epithelium
(c) ciliated columnar epithelium
(d) squamous epithelium

2. The cell junctions called tight, adhering and gap junctions are found in
(a) connective tissue (b) epithelial tissue
(c) neural tissue (d) muscular tissue

3. Housefly possesses
(a) two pairs of wings (b) one pair of wings
(c) three pairs of wings (d) four pair of wings

4. Excretory organs of Cockroach are
(a) flame cells
(b) nephridia
(c) hreen glands
(d) malpighian tubules

5. Myoglobin is present in
(a) all muscle fibres
(b) white muscle fibres only
(c) red muscle fibres only
(d) both white and red muscle fibres

6. Intercalated discs are the communication junctions between the cells of
(a) cardiac muscles
(b) striped muscles
(c) adipose tissue
(d) nerve and striated muscles

RESPONSE GRID	1. ⓐⓑⓒⓓ 2. ⓐⓑⓒⓓ 3. ⓐⓑⓒⓓ 4. ⓐⓑⓒⓓ 5. ⓐⓑⓒⓓ 6. ⓐⓑⓒⓓ

Space for Rough Work

7. What is common among silverfish, scorpion, crab and honey bee?
(a) Compound eyes (b) Poison glands
(c) Jointed legs (d) Metamorphosis

8. Mast cells are associated with
(a) exocrine glands
(b) endocrine glands
(c) areolar connective tissue
(d) neural tissue

9. Lymph differs from blood in possessing
(a) only WBCs.
(b) more RBCs and WBCs.
(c) more RBCs and few WBCs.
(d) more WBCs and few RBCs.

10. Pseudostratified epithelium is found in
(a) oesophagus (b) respiratory tract
(c) urinary tract (d) kidney

11. Given below are four matchings of an animal and its kind of respiratory organ :
(i) Silver fish – trachea
(ii) Scorpion – book lung
(iii) Sea squirt – pharyngeal gills
(iv) Dolphin – skin
The correct matchings are
(a) (iii) and (iv) (b) (i) and (iv)
(c) (i), (ii) and (iii) (d) (ii) and (iv)

12. Tendons and ligaments are the examples of
(a) areolar connective tissue
(b) adipose tissue
(c) dense regular connective tissue
(d) loose connective tissue

13. Major inorganic component of vertebrate bone is
(a) calcium carbonate
(b) calcium phosphate
(c) sodium hydroxide
(d) potassium hydroxide

14. Histamine is secreted by
(a) mast cells (b) fibroblast
(c) histocytes (d) melanocytes

15. Which of the following is not a granulocyte?
(a) Lymphocyte (b) Neutrophil
(c) Basophil (d) Eosinophil

16. The type of epithelial cells which line inner surface of fallopian tubes, bronchioles and small bronchi are known as
(a) squamous epithelium (b) columnar epithelium
(c) ciliated epithelium (d) cubical epithelium

17. Male and female cockroaches can be distinguished externally through
(a) anal styles in male
(b) anal cerci in female
(c) anal style and antennae in females
(d) both (b) and (c)

18. The long bones are hollow and connected by air passage. They are characteristic of
(a) aves (b) mammalia
(c) reptilia (d) sponges

19. The most active phagocytic white blood cells are
(a) neutrophils and monocytes
(b) neutrophils and eosinophils
(c) lymphocytes and macrophages
(d) eosinophils and lymphocytes

20. In the mouthparts of the cockroach, the organ of mastication is
(a) labium (b) maxillae
(c) mandibles (d) labrum

21. Which one of the following groups of structures/organs have similar function?
(a) Typhlosole in earthworm, intestinal villi in rat and contractile vacuole in *Amoeba*.
(b) Nephridia in earthworm, malpighian tubules in cockroach and urinary tubules in rat.
(c) Antennae of cockroach, tympanum of frog and clitellum of earthworm.
(d) Incisors of rat, gizzard (proventriculus) of cockroach and tube feet of starfish.

RESPONSE GRID					
7. (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)
12. (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)
17. (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)

Space for Rough Work

22. Which of the following statements are wrong?
(i) Leucocytes disintegrate in the spleen and liver.
(ii) RBC, WBC and blood platelets are produced by bone marrow.
(iii) Neutrophils bring about destruction and detoxification of toxins of protein origin.
(iv) The important function of lymphocytes is to produce antibodies.
(a) (i) and (ii) only (b) (i) and (iv) only
(c) (i) and (iii) only (d) (ii) and (iii) only

23. Malpighian tubules are the excretory organs in
(a) Cockroach (b) Platyhelminthes
(c) *Ascaris* (d) *Pila*

24. Young one of the cockroach is called
(a) Naid (b) Grub
(c) Nymph (d) Maggot

25. Cilia, Flagella and microvilli are associated with the
(a) Connective tissue (b) Epithelial tissue
(c) Nervous tissue (d) Muscular tissue

26. In which of the following animals, respiration occurs without any respiratory organ?
(a) Frog (b) Fish
(c) Cockroach (d) Earthworm

27. Which of the following type of cell junction is not found in animal tissues ?
(a) Desmosome (b) Tight junction
(c) Gap junction (d) Plasmodesmata

28. Which one of the following cellular components of the blood is responsible for the production of antibodies?
(a) Thrombocyte (b) Lymphocyte
(c) Monocyte (d) Erythrocyte

29. Sprain is caused due to the excessive pulling of
(a) Muscles (b) Tendons
(c) Ligaments (d) All of the above

30. In cockroach, the corpora allata is
(a) A sense organ (b) A tactile organ
(c) An endocrine organ (d) A digestive gland

31. Which of the following is incorrect w.r.t stucture/gland of cockroach and its total number in body?
(a) Collateral glands in female cockroach - 2
(b) Malpighian tubules - 100- 150
(c) Spiracles - 10
(d) Ommatidia in each compound eye - 2000

32. The function of basement membrane in epithelial tissue is to
(a) Facilitate communication of cells with each other
(b) Allow rapid ion transfer among cells
(c) Separate the epithellal tissue from underlying connective tissue
(d) Produce multiple layers of cells in a compound epithelium

33. All among the following are function of connective tissue except
(a) Binding support
(b) Fat storage
(c) Body defense and transport
(d) Propelling mucus towards the pharynx

34. Mark the statement that is incorrect for smooth muscles.
(a) Smooth muscles from the muscular component of the visceral organs such as blood vessels, urinary bladder, ciliary body etc.
(b) Smooth muscles cells do not have the troponin-tropomyosin mechanism of controlling contraction
(c) Irritability is shown by all smooth muscles except ciliary muscles
(d) Hair root muscles and muscles on the large blood vessels are in example of multi-unit smooth muscles

35. The avascular nature of cartilage is responsible for its
(a) Flexibility
(b) Slow repair
(c) Suitability for embryonic endoskeleton
(d) Transparent consistency

RESPONSE GRID					
	22. (a)(b)(c)(d)	**23.** (a)(b)(c)(d)	**24.** (a)(b)(c)(d)	**25.** (a)(b)(c)(d)	**26.** (a)(b)(c)(d)
	27. (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)	**30.** (a)(b)(c)(d)	**31.** (a)(b)(c)(d)
	32. (a)(b)(c)(d)	**33.** (a)(b)(c)(d)	**34.** (a)(b)(c)(d)	**35.** (a)(b)(c)(d)	

Space for Rough Work

36. Match Column-I with Column-II and select the correct option from the codes given below.

	Column-I		Column-II
A.	Hyaline cartilage	I.	Pectoral girdle of frog
B.	Fibrous cartilage	II.	Long bones; sternum; ribs
C.	Elastic cartilage	III.	Pubic symphysis
D.	Calcified cartilage	IV.	Eustachain tube; epiglottis

(a) A-I; B-II; C-III; D-IV
(b) A-II; B-III; C-IV; D-I
(c) A-II; B-IV; C-III; D-I
(d) A-IV; B-III; C-II; D-I

37. The type of epithelial cells which line the inner surface of Fallopian tubes, bronchioles and small bronchi are known as
(a) squamous epithelium
(b) columnar epithelium
(c) ciliated epithelium
(d) cubical epithelium

38. The wall of heart is thick due to
(a) Pericardium (b) Epicardium
(c) Myocardium (d) Endocardium

39. The strongest cartilage is
(a) Hyaline cartilage
(b) Elastic cartilage
(c) Fibrous cartilage
(d) None of the above

40. Nissl's granules are found in cyton of nerve cells. These have affinity for basic dyes. The granules are made up of
(a) Protein (b) DNA
(c) Amino acids (d) RNA

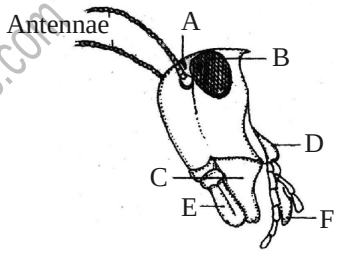
41. The inability to absorb digested nutrients may be due to damage of which type of epithelium?
(a) Ciliated columnar
(b) Simple columnar
(c) Simple squamous
(d) Simple cuboidal

42. The presence of a basement membrane is typical of most
(a) Epithelial tissues
(b) Connective tissues
(c) Nervous tissues
(d) Muscle tissues

43. The most appropriate definition of Neuroglial cells are that they are
(a) Nonsensory supporting cells
(b) Secretory cells
(c) Sensory cells
(d) Sensory and supporting cells

44. Covering around bone is called
(a) Perichondrion
(b) Periosteum
(c) Epiosteum
(d) Endosteum

45. The figure given below shows the head region of cockroach. Identify A to F.



(a) A- Compound eye, B-Ocellus, C-Maxilla, D-Mandible, E-Labrum, F-Labium
(b) A- Ocellus, B-Compound eye, C-Mandible, D-Maxilla, E-Labrum, F-Labium
(c) A- Ocellus, B-Compound eye, C-Mandible, D-Maxilla, E-Labium, F-Labrum
(d) A- Ocellus, B-Compound eye, C-Maxilla, D-Mandible, E-Labrum, F-Labium

RESPONSE GRID					
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 7 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB08

SYLLABUS : Cell: The Unit of Life

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. The cell organelle involved in glycosylation of protein is
(a) ribosome
(b) peroxisome
(c) endoplasmic reticulum
(d) mitochondria

2. The outer layer of vacuole is called
(a) cell wall (b) tonoplast
(c) plasmalayer (d) leucoplast

3. Which of the following cell organelle remains enveloped by a single unit membrane?
(a) Mitochondria (b) Lysosomes
(c) Nucleus (d) Chloroplast

4. Choose the correct option.
(i) Lysosomes are double membranous vesicles budded off from Golgi apparatus and contain digestive enzymes.
(ii) Endoplasmic reticulum consists of a network of membranous tubule and helps in transport, synthesis and secretion.
(iii) Leucoplasts are bound by two membranes, lack pigment but contain their own DNA and protein synthesising machinery.
(iv) Sphaerosomes are single membrane bound organelle which are associated with synthesis and storage of lipids.
(a) (i) only (b) (i) and (ii)
(c) (ii), (iii) and (iv) (d) All of these

5. The nucleolus is the site of formation of
(a) spindle fibres (b) chromosomes
(c) ribosomes (d) peroxisomes

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

6. Which one of the following combination is mismatched?
(a) Glycocalyx - may be capsule or slime layer
(b) Pili - Reproduction
(c) Cell wall - Protective, determines shape, prevents from bursting
(d) Flagella, Pili and Fimbriae - Surface structures of bacterial cell

7. The fluidity of membranes in a plant in cold weather may be maintained by
(a) increasing the number of phospholipids with unsaturated hydrocarbon tails
(b) increasing the proportion of integral proteins
(c) increasing concentration of cholesterol in membrane
(d) increasing the number of phospholipids with saturated hydrocarbon tail

8. The cell as a basic unit of structure of living beings was discovered by
(a) Aristotle
(b) Robert Hooke
(c) Schleiden and Schwann
(d) Gregore Mendel

9. Which pair of structures are usually found in both plant and animal cells?
(a) Cell membrane and nucleolus
(b) Cell membrane and cell wall
(c) Nucleolus and chloroplast
(d) Nucleus and cell wall

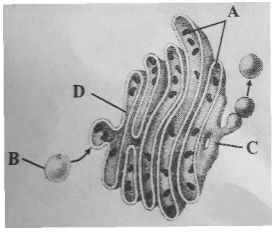
10. Most abundant lipid in the cell membrane is
(a) cholesterol (b) phospholipids
(b) glycolipids (d) cerebrosides

11. If you remove the fimbriae from the bacterial cell, which of the following would you expect to happen?
(a) The bacteria could no longer swim
(b) The bacteria would not adhere to the host tissue
(c) Transportation of molecules across the membrane would stop
(d) The shape of bacteria would change

12. Cell recognition and adhesion are facilitated by components of plasma membrane. These components are generally
(a) protein molecules alone
(b) lipids alone
(c) both lipids and proteins
(d) glycolipids and glycoproteins

13. Smooth endoplasmic reticulum is well developed in the cells which synthesize
(a) steorids (b) proteins
(c) carbohydrates (d) all of these.

14. Select the option with correct labelling of given structure of Golgi apparatus.



	A	B	C	D
(a)	Cisternae	Vesicle	*trans* face	*cis* face
(b)	Cisternae	Vesicle	*cis* face	*trans* face
(c)	Vesicle	Cisternae	*cis* face	*trans* face
(d)	Tubules	Vesicle	*trans* face	*cis* face

15. The molecules in the membrane that limit its permeability are the
(a) carbohydrates (b) phospholipids
(c) proteins (d) water

16. pH of vacuolar cell sap is
(a) neutral and isotonic.
(b) alkaline and isotonic.
(c) acidic and hypertonic.
(d) equal to cytoplasm and isotonic.

17. All plastids have essentially the same structure because
(a) they have to perform the same function
(b) they are localised in the aerial parts of plants

RESPONSE GRID					
	6. (a)(b)(c)(d)	**7.** (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)
	11. (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)
	16. (a)(b)(c)(d)				

Space for Rough Work

(c) one type of plastids can differentiate into another type of plastids depending upon the cell requirements
(d) all plastids have to store starch, lipids and proteins

18. A Semi-autonomous organelle.
B Have linear DNA as well as RNA
C Carry out ATP synthesis.
D Have quantasomes embedded in thylakoid membrane
E. Occurs in all photosynthetic organisms.
Find the correct number of statements w.r.t. plastids.
(a) One (b) Two
(c) Three (d) Four

19. Select incorrect matching
(a) Elaioplasts - Oils
(b) Chromoplasts - Fat soluble anthocyanin pigments
(c) Mitochondria - Fission in G_2 phase
(d) Contractile vacuole - Excretion

20. Quasi-fluid nature of membrane is due to
(a) Phospholipid (b) Integral protein
(c) Peripheral protein (d) Sugar moiety

21. Gas vacuole is present in
(a) Blue green algae
(b) Purple photosynthetic bacteria
(c) Green photosynthetic bacteria
(d) All of the above

22. Which of the following feature is not associated with centrosome?
(a) Pericentriolar material
(b) Two cylindrical structures
(c) Two centriole
(d) Lipid bilayer covering

23. What is the site of DNA and centriole duplication respectively?
(a) Nucleus, nucleus
(b) Nucleus, cytoplasm
(c) Cytoplasm, nucleus
(d) Nucleus, nucleolous

24. Cell wall
(a) Helps in cell to cell interaction
(b) Protects the cell from infection
(c) Contains minerals like calcium carbonate in certain algae
(d) All are correct

25. Read the following statements carefully and choose the correct options w.r.t. eukaryotic cell.
I. All eukaryotic cells are identical in structure
II. Mitochondria and plastids are semi-autonomous organelles
III. Ribosomes are associated with plasma membrane
IV. There is an extensive compartmentalization of cytoplasm through the presence of membrane bound organelles
(a) I & IV (b) II & IV
(c) I & III (d) II & III

26. Golgi bodies are involved in
(a) Recycling of broken plasma membrane during endocytosis
(b) Synthesis of glycolipids
(c) Modification of proteins
(d) All of the above

27. Which of the following organelles lack membrane in eukaryotic cell?
A. Cilia B. Lysosome
C. RER D. Ribosomes
E. Flagella F. Centrioles
(a) D & F (b) C & D
(c) A & D (d) A & E

28. Aleuroplasts, amyloplasts and elaioplasts
(a) Divide by multiple fission
(b) Store protein, starch and fat respectively
(c) Help in photolysis of water
(d) Store reserve food and pigments

29. Reformation of nucleolus, golgi complex and ER occurs in
(a) Telophase (b) Metaphase
(c) Prophase (d) Anaphase

30. Ribosomes of the cytoplasm, chloroplast and mitochondrion are respectively
(a) 80S, 80S and 70S (b) 80S, 70S and 70S
(c) 70S in all (d) 80S in all

31. Integral cell membrane proteins
(a) are partially embedded in lipid layers
(b) are completely embedded in lipid layers

RESPONSE GRID					
	17. (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)
	22. (a)(b)(c)(d)	**23.** (a)(b)(c)(d)	**24.** (a)(b)(c)(d)	**25.** (a)(b)(c)(d)	**26.** (a)(b)(c)(d)
	27. (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)	**30.** (a)(b)(c)(d)	

Space for Rough Work

(c) show lateral but not vertical movements within bilayer of lipid
(d) All of these

32. Which group of organelles is involved in synthesis of substances needed by cell?
(a) Lysosome, vacuole, ribosome
(b) Vacuole, RER, SER
(c) Ribosome, RER, SER
(d) RER, lysosome, vacuole

33. Who gave the lamellar or sandwich model of cell membrane?
(a) Singer and Nicolson
(b) Danielle and Davson
(c) J. Robertson
(d) None of these

34. Microtubules are absent in
(a) mitochondria (b) flagella
(c) spindle fibres (d) centriole

35. Which of the following contributes to differences in the two sides of the cell membrane?
(a) Differences in peripheral proteins
(b) Different domains expressed on the ends of integral proteins
(c) Differences in phospholipid types
(d) All of the above

36. Which of the following cell membrane components serve as recognition signals for interactions between cells?
(a) Recognition proteins
(b) Glycolipids or glycoproteins
(c) Phospholipids
(d) Integral proteins

37. Channel proteins allow ions that would not normally pass through the cell membrane to go through the channel. What properties of the proteins are responsible for this?
(a) The channels are often composed of charged or polar R groups.
(b) The channels are often composed of hydrophobic R groups.
(c) a and b
(d) None of the above

38. Which of the following is present in both prokaryotes and eukaryotes?
(a) Lysosome (b) Vesicles
(c) Chloroplast (d) Plasma membrane

39. Both chloroplasts and mitochondria
(a) have multiple membranes.
(b) have highly structured innermost membranes.
(c) are found only in eukaryotic cells.
(d) All of the above

40. Microtubules, motor proteins, and actin filaments are all part of the
(a) mechanism of photosynthesis that occurs in chloroplasts.
(b) rough ER in prokaryotic cells.
(c) cytoskeleton of eukaryotic cells.
(d) process that moves small molecules across cell membranes.

41. The cell wall of both bacteria and cyanobacteria contains
(a) Lipid (b) Pectin
(c) Protein (d) Muramic acid

42. Mesosomes were taken as
(a) Golgi bodies (b) Plastids
(c) Mitochondria (d) Endoplasmic reticulum

43. Pit membrane of simple pit is formed by :
(a) Secondary cell wall (b) Middle lamella
(c) Primary cell wall (d) Plasma

44. Which one of the following cell organelles found only in plants?
(a) Golgi complex (b) Mitochondria
(c) Plastids (d) Ribosomes

45. Peroxisomes are rich in
(a) DNA (b) RNA
(c) Catalytic enzymes (d) Oxidative enzymes

RESPONSE GRID					
	31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 8 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB09

SYLLABUS : Biomolecules

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. A nucleotide is formed of
(a) Purine, pyrimidine and phosphate
(b) Purine, sugar and phosphate
(c) Nitrogen base, sugar and phosphate
(d) Pyrimidine, sugar and phosphate

2. Glycogen is a polymer of
(a) galactose (b) glucose
(c) fructose (d) sucrose

3. Most abundant organic compound on earth is
(a) Protein (b) Cellulose
(c) Lipids (d) Steroids

4. Protein synthesis in a cell takes place
(a) only in the cytoplasm
(b) in the nucleolus as well as in cytoplasm
(c) in cytoplasm as well as in mitochondria
(d) only on ribosomes attached to the nuclear envelope

5. In RNA, thymine is replaced by
(a) Adenine (b) Guanine
(c) Cytosine (d) Uracil

6. Which of the following is a reducing sugar?
(a) Galactose (b) Gluconic acid
(c) β-methyl galactoside (d) Sucrose

7. An enzyme that can stimulate germination of barley seeds is
(a) lipase (b) protease
(c) invertase (d) α-amylase

8. Carrier ions like Na^+ facilitate the absorption of substances like:
(a) amino acids and glucose
(b) glucose and fatty acids
(c) fatty acids and glycerol
(d) fructose and some amino acids

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ		

Space for Rough Work

9. An enzyme brings about
(a) decrease in reaction time
(b) increase in reaction time
(c) increase in activation energy
(d) reduction in activation energy

10. The enzymes hexokinase which catalyses glucose to glucose-6-phosphate in glycolysis is inhibited by glucose-6-phosphate. This is an example of
(a) competitive inhibition
(b) non-competitive inhibition
(c) feedback allosteric inhibition
(d) positive feedback

11. The enormous diversity of protein molecules is due mainly to the diversity of
(a) amino groups on the amino acids
(b) R groups on the amino acids
(c) amino acid sequences within the protein molecule
(d) peptide bonds

12. Length of one turn of the helix in a B-form DNA is approximately
(a) 3.4 nm (b) 2 nm
(c) 0.34 nm (d) 20 nm

13. The catalytic efficiency of two different enzymes can be compared by the
(a) formation of the product
(b) pH optimum value
(c) K_m value
(d) molecular size of the enzyme

14. Which of the following sets contains polysaccharides?
(a) Glucose, fructose, lactose
(b) Starch, glycogen, cellulose
(c) Sucrose, maltose, cellulose
(d) Galactose, starch, sucrose

15. Sigmoid growth curve is represented by
(a) $dN/dt = rN$
(b) $dN/dt = rN (1 – N/K)$
(c) $Nt = N_0 + B + I – D – E$
(d) $dN/dt = 1 – N/K$

16. A coenzyme is
(a) Same enzyme that occurs in different tissues such as heart and muscle
(b) One that shares the function of other enzyme
(c) Organic or inorganic in nature and helps activate metabolic enzymes
(d) Organic non-protein in nature and helps to activate metabolic enzymes

17. The most basic amino acid is
(a) Arginine (b) Histidine
(c) Glycine (d) Glutamine

18. Which of the following is not an aromatic amino acid?
(a) Valine (b) Tyrosine
(c) Phenylalanine (d) Tryptophan

19. The class of enzymes that catalyze the removal of a group from a substrate without addition of water, leaving double bonds, is
(a) Transferases (b) Dehydrogenases
(c) Hydrolases (d) Lyases

20. Which of the following is a component of vitamin (thiamine, biotin), Acetyl CoA, cysteine, methionine and ferredoxin?
(a) Fe (b) S
(c) Co (d) K

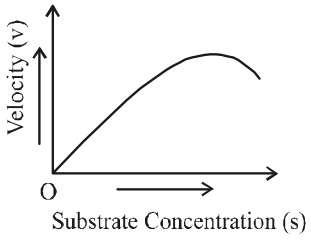
21. The helical structure of protein is stabilized by
(a) Ester (b) Peptide bonds
(c) Disulphide bonds (d) Hydrogen bonds

22. Cellulose is a polymer of
(a) α-glucose (b) α-D-glucose
(c) β-D-glucose (d) β-L-glucose

RESPONSE GRID					
9. ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ
14. ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ
19. ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	

Space for Rough Work

23. The given graph shows the effect of substrate concentration on the rate of reaction of the enzyme green -gram - phosphatase. What does the graph indicate ?

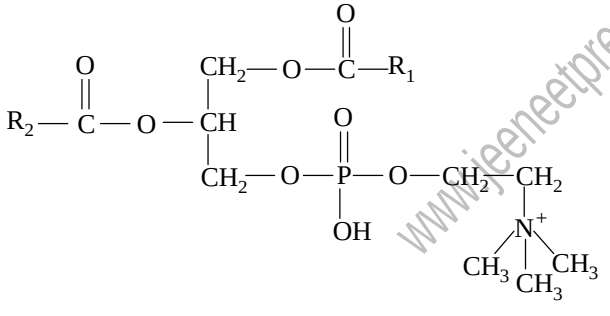


(a) The rate of enzyme reaction is directly proportional to the substrate concentration
(b) Presence of an enzyme inhibitor in the reaction mixture
(c) Formation of an enzyme-substrate complex
(d) At higher substrate-concentration the pH increases.

24. The Km value of the enzyme is the value of the substrate concentration at which the reaction reaches to
(a) Zero (b) 2 Vmax
(c) ½ Vmax (d) ¼ Vmax

25. Which group contains biocatalysts?
(a) Myosin, oxytocin, adrenalin
(b) Peptidase, amylase, rennin
(c) Glucose, amino acids, fatty acids
(d) Rhodopsin, pepsin, steapsin

26.



Given structural formula is correctly identified alongwith its related function by which of the following options?
(a) Cholesterol – A component of animal cell membrane
(b) Lecithin – A component of cell membrane
(c) Triglyceride – An energy source
(d) Adenosine – A component of nucleic acids

27. Select the option that correctly identifies the chemical bonds present in the given biomolecules.
Polysaccharides – A, Proteins – B, Fats – C, Water – D

	A	B	C	D
(a)	Ester	Peptide	Glycosidic	Hydrogen
(b)	Glycosidic	Peptide	Ester	Hydrogen
(c)	Glycosidic	Peptide	Hydrogen	Ester
(d)	Hydrogen	Ester	Peptide	Glycosidic

28. Which of the following statements is not correct regarding chitin?
(a) It is a storage polysaccharide
(b) It is a homopolysccharide
(c) It is a constituent of arthropod exoskeleton and fungal cell wall
(d) It is the second most abundant carbohydrate on earth

29. Which of the following secondary metabolites are used as drugs?
(a) Abrin and ricin
(b) Vinblastin and curcumin
(c) Anthocyanins
(d) Gums and cellulose

30. Enzymes that catalyse removal of groups from substrates by mechanisms other than hydrolysis, and addition of groups to double bonds, are called
(a) ligases (b) lyases
(c) hydrolases (d) dehydrogenases

31. Which of the following statement is incorrect w.r.t. starch?
(a) Starch consists of unbranched amylose and branched amylopectin
(b) It is a polymer of α-D-glucose
(c) Successive glucose units are linked together by α 1 → 6 linkage and at branching α 1 → 4 linkage is found
(d) Starch turns black with iodine

RESPONSE GRID					
	23. ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ
	28. ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	

Space for Rough Work

32. Cellulose differs from chitin in
(a) Branching
(b) Type of glycosidic bond
(c) Type of monomer unit
(d) Abundancy in biosphere

33. Oils are rich in
(a) Glycerol that possesses three hydroxyl groups
(b) Saturated fatty acids
(c) Fats that are generally liquid at room temperature
(d) Esters of fatty acids

34. Bonds that do not exist in tertiary structure of proteins
(a) Covalent bonds
(b) Phosphodiester bonds
(c) Hydrophobic etnractions
(d) Ionic bonds

35. Cleavage of specific covalent bonds and removal of groups without hydrolysis is the property of
(a) Isomerases (b) Lyases
(c) Hydrolases (d) Transferases

36. The catalytic efficiency of two different enzymes can be compared by the
(a) K_m value
(b) pH value
(c) Formation of the product
(d) Molecular size of the enzyme

37. Which of the following is an example of isozyme?
(a) α-Amylase
(b) Glucokinase
(c) Lactate dehydrogenase
(d) All of these

38. Essential amino acids include
(a) leucine (b) valine
(c) tryptophan (d) all of these

39. Acidic amino acids have two –COOH groups and one – NH_2 group per molecule. Select the pair that consists of acidic amino acids.
(a) Aspartic acid, glutamic acid
(b) Lysine, arginine
(c) Glycine, alanine
(d) Both (a) and (b)

40. The structure of glucose and galactose are same except with regard to
(a) First carbon atom
(b) Second carbon atom
(c) Third carbon atom
(d) Fourth carbon atom

41. All the following statements are true with regard to glucose, except :
(a) It is an aldohexose
(b) It is a reducing sugar
(c) It is present in starch and cellulose
(d) It is an epimer of fructose

42. Guanylic acid is a
(a) Nucleoside of purine
(b) Nucleoside of pyrimidine
(c) Nucleotide of purine
(d) Nucleotide of pyrimidine

43. Long chain molecules of fatty acids are formed by
(a) Polymerisation of 2 carbon compounds
(b) Decomposition of fats
(c) Polymerisation of glycogen
(d) Conversion of glycogen

44. Read the following four statements (A to D) and mark the option that has both correct statements
A. Blood conc. of glucose in a normal healthy man is 4.5 to 5.0 mM
B. In proteins only left handed helices are observed
C. The pitch of B- DNA is 3.4 Angstrom
D. At each step of ascent the strand of DNA turns 36 degree
(a) A, B (b) B, C (c) C, D (d) A, D

45. Which one of the following biomolecules is correctly characterized?
(a) Lecithin - A phosphorylated glyceride found in cell membrane.
(b) Palmitic acid - An unsaturated fatty acid with 18 carbon atoms.
(c) Adenylic acid - Adenosine with a glucose phosphate molecule.
(d) Alanine amino acid - Contains an amino group and an acidic group anywhere in the molecule.

RESPONSE GRID					
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ
	37. ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ
	42. ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 9 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB10

SYLLABUS : Cell Cycle and Cell Division

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. In cell cycle, DNA replication takes place in
(a) G_1 phase (b) G_2 phase
(c) mitotic metaphase (d) S phase

2. During cell division, the spindle fibres attach to the chromosome at a region called
(a) chromocentre (b) kinetochore
(c) centriole (d) chromomere

3. Chromosome duplication without nuclear division refers to
(a) meiosis (b) mitosis
(c) androgenesis (d) endomitosis

4. During which stages (or prophase I substages) of meiosis do you expect to find the bivalents and DNA replication respectively?
(a) Pachytene and interphase (between two meiotic divisions)
(b) Pachytene and interphase (just prior to prophase I)
(c) Pachytene and S phase (of interphase just prior to prophase I)
(d) Zygotene and S phase (of interphase prior to prophase I)

5. The two chromatids of a metaphase chromosome represent
(a) replicated chromosomes to be separated at anaphase
(b) homologous chromosomes of a diploid set
(c) non-homologous chromosomes joined at the centromere
(d) maternal and paternal chromosomes joined at the centromere

6. Recombination of genes occur at
(a) prophase in mitosis
(b) prophase I in meiosis
(c) prophase II in meiosis
(d) metaphase II in meiosis

RESPONSE GRID	1. ⓐⓑⓒⓓ 2. ⓐⓑⓒⓓ 3. ⓐⓑⓒⓓ 4. ⓐⓑⓒⓓ 5. ⓐⓑⓒⓓ 6. ⓐⓑⓒⓓ

Space for Rough Work

7. Four daughter cells formed after meiosis are
(a) genetically similar (b) genetically different
(c) anucleate (d) multinucleate

8. In animal cells, cytokinesis involves
(a) the separation of sister chromatids
(b) the contraction of the contractile ring of microfilament
(c) depolymerisation of kinetochore microtubules
(d) a protein kinase that phosphorylates other enzymes

9. The number of chromatids in a chromosome at anaphase is
(a) 2 in mitosis and 1 in meiosis
(b) 1 in mitosis and 2 in meiosis
(c) 2 each in mitosis and meiosis
(d) 2 in mitosis and 4 in meiosis

10. During cell division, sometimes there will be failure of separation of sister chromatids. This event is called
(a) interference (b) complementation
(c) non-disjunction (d) coincidence

11. In which stage of the cell cycle histone proteins synthesized in a eukaryotic cell?
(a) During G_2 stage of prophase
(b) During S-phase
(c) During entire prophase
(d) During telophase

12. What is true about telophase stage?
(a) Chromosomes lose their identity as discrete elements
(b) Chromosomes cluster at opposite spindle poles
(c) Nuclear envelope, nucleolus, Golgi complex and ER reform
(d) All of these

13. Match Column-I with Column-II and select the correct option from the codes given below.

	Column-I		Column-II
A.	Disintegration of nuclear membrane	I.	Anaphase
B.	Appearance of nucleolus	II.	Prophase
C.	Division of centromere	III.	Telophase
D.	Replication of DNA	IV.	S-phase

(a) A-II; B-III; C-I; D-IV
(b) A-II; B-III; C-IV; D-I
(c) A-III; B-II; C-I; D-IV
(d) A-III; B-II; C-IV; D-I

14. The centromere is situated close to its ends and forming one extremely short and one very long arm in
(a) Metacentric chromosome
(b) Sub-metacentric chromosome
(c) Acrocentric chromosome
(d) Telocentric chromosome

15. Select the events that do not occur in interphase stage of cell-cycle
A. RNA and protein synthesis.
B. Cytoplasmic growth.
C. Polymerisation of spindle fibres protein.
D. Disappearance of Golgi bodies and ER.
E. DNA molecules in highly supercoiled stage.
(a) C, D & E (b) D & E only
(c) B, C & D (d) C & D only

16. The stage between two meiotic divisions is called interkinesis and
(a) Is long lived
(b) Is followed by prophase I
(c) Is generally short lived and followed by prophase II
(d) Involves duplication of genes and centrioles

17. Which is correct w.r.t. anaphase?
(a) Centromeres split and chromatids separate
(b) Spindle fibres attach to kinetochores
(c) Chromosomes are moved to spindle equator
(d) Chromatid splits by recombinase activity

18. Maximum cytoplasmic growth occurs in
(a) G_1-phase (b) S-phase
(c) G_2-phase (d) M-phase

19. Diagrammatic representation of chromosomes of a species, is called
(a) Karyotype (b) Crytogram
(c) Cladogram (d) Idiogram

20. Which one of the following events is incorrect for cell cycle?
(a) All events are under genetic control
(b) Maximum cell growth occurs in M-phase
(c) DNA synthesis occurs only during one specific
(d) Centriole duplication occurs in S-phase

RESPONSE GRID					
	7. (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)
	12. (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)
	17. (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	

Space for Rough Work

21. The sequence of events by which a cell duplicates its genome, synthesises other constituents of the cell and eventually divide into two daughter cell is termed as
(a) Karyochorists (b) I-phase
(c) Cell cycle (d) M-phase

22. Lampbrush chromosomes are seen in which typical stage?
(a) Mitotic anaphase (b) Mitotic prophase
(c) Mitotic metaphase (d) Meiotic prophase

23. In telophase of mitosis, the mitotic spindle breaks down and nuclear membranes form. This is essentially the opposite of what happens in
(a) prophase. (b) interphase.
(c) metaphase. (d) S phase.

24. Most cells divide if they receive the proper signal at a checkpoint in the _____ phase of the cell cycle.
(a) M (b) G_1 (c) S (d) G_2

25. Which of the following carry the same genetic information?
(a) sister chromatids
(b) X and Y chromosomes
(c) all autosomes
(d) homologous chromosomes

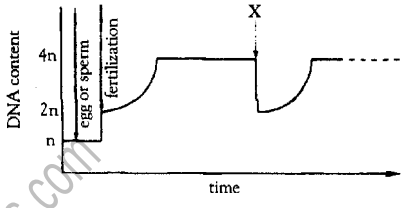
26. A zoologist examined an intestine cell from a crayfish and counted 200 chromosomes, each consisting of 2 chromatids, at prophase I of mitosis. What would he expect to see in each of the four cells at telophase II of meiosis if he looked in the crayfish ovary?
(a) 50 chromosomes, each consisting of 2 chromatids
(b) 50 chromosomes, each consisting of 1 chromatid
(c) 100 chromosomes, each consisting of 2 chromatids
(d) 100 chromosomes, each consisting of 1 chromatid

27. Which of the following is true of kineto-chores?
(a) They are localized at the centromere of each chromosome.
(b) They are the sites where microtubules attach to separate the chromosomes.
(c) They are organized so that there is one per sister chromatid in meiosis.
(d) All of the above

28. Chromosome movement during anaphase is the result of :
(a) the molecular motors at the kinetochores that move the chromosomes toward the poles.
(b) molecular motors at the centrosome that pull the microtubules toward the poles.
(c) shortening of the microtubules at the centrosome that pull the chromosomes toward the poles.
(d) a and c

29. Programmed cell death (apoptosis) :
(a) occurs in cells that have been deprived of essential nutrients.
(b) occurs only in cells that have damaged DNA
(c) is a natural process during development.
(d) is signaled by the initiated of mitosis.

30. The following graph represents the changes in the quantity of DNA present in the cell cycle at different stages.



What stage takes place at X?
(a) anaphase (b) cytokinesis
(c) interphase (d) metaphase

31. The absence of centrioles from higher plant cells means that during somatic cell nuclear division there is :
(a) no apparent organiser of mitotic spindles
(b) no equatorial arrangement of chromo-somes at metaphase.
(c) no new cell wall laid down at telophase.
(d) no spindle formed.

32. The amount of DNA in a mammalian cell in early prophase I is x.
What is the amount of DNA in the same cell in anaphase I of meiosis?
(a) $\frac{x}{4}$ (b) $\frac{x}{2}$ (c) x (d) 2x

RESPONSE GRID					
	21. ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ
	26. ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ
	31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ			

Space for Rough Work

33. Fully differentiated cells which do not divide are supposed to be in :
(a) G_1 - phase (b) G_2 - phase
(c) S - phase (d) G_0 - phase

34. A cell can not divide if it does not cross :
(a) Hayflick limit (b) cytokinesis
(c) restriction point (d) G_0 - phase

35. Synapsis is of _____ kind(s) :
(a) one (b) two (c) three (d) four

36. If a stock has 2n = 48 and scion microspore mother cell has 2n = 24; then root cell and the microspores will have _____ chromosomes respectively.
(a) 12, 48 (b) 48, 12 (c) 24, 12 (d) 24, 96

37. A plant has number of chromosome groups arranged at equatorial plane of metaphase-I whose 2n = 50; the number of chromosomes visible will be :
(a) 100 (b) 25 (c) 50 (d) 75

38. To produce 10 seeds how many meiosis will be needed and how many pollen grain will be wasted?
(a) 13 and 2 (b) 2 and 14
(c) 10 and 10 (d) None

39. Which one of the following list contain the correct order of meiotic events ?
(a) Separation of sister chromatids, recombination, formation of the synaptonemal complex, separation of homologous chromosomes
(b) Separation of homologous chromosomes, formation of the synaptonemal complex, recombination, separation of sister chromatids
(c) Formation of synaptonemal complex, recombination, separation of sister chromatids, separation of homologous chromosomes
(d) Formation of the synaptonemal complex, recombination, separation of homologous chromosomes, separation of sister chromatids.

40. In meiosis, actual haploidy in terms of DNA comes in
(a) Metaphase-I (b) Anaphase-II
(c) Anaphase-I (d) Interkinesis

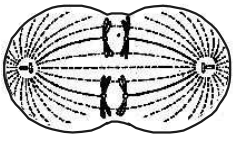
41. Which of the following can not be considered as mitogen ?
(a) Cytokinin (b) Insulin
(c) Cholchicine (d) Auxin

42. G_2 phase is not assiciated with
(a) Synthesis of some non-histone proteins
(b) Synthesis of tubulin proteins for spindle fibres
(c) DNA synthesis
(d) Duplication of centrioles

43. Replication of centriole occurs during
(a) Early anaphase (b) Mid metaphase
(c) Late metaphase (d) Interphase

44. A cell in mitotic prophase can be distinguished from a cell in meiotic prophase by
(a) Formation of tetrad in a meiotic cell
(b) The terminalization of chiasmata in late prophase of mitosis
(c) Zipping in early prophase of mitosis
(d) Presence of only half as many chromosomes in the meiotic cell

45. The diagram shows a cell whose diploid chromosome number is four. Which one of the following option shows correct stage of cell ?



(a) Metaphase
(b) Anaphase of mitosis
(c) Anaphase I of meiosis
(d) Anaphase II of meiosis

RESPONSE GRID					
	33. ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ
	38. ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ
	43. ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ		

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 10 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	50
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB11

SYLLABUS : Transport in Plants

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Water potential is equal to
(a) Ψ_s + O.P. (b) Ψ_s + T.P.
(c) $\Psi_p + \Psi_w$ (d) $\Psi_s + \Psi_p$

2. The movement of mineral ions into plant root cells as a result of diffusion is called
(a) osmosis
(b) active absorption
(c) passive absorption
(d) endocytosis

3. In soil, the water available for root absorption is
(a) gravitational water (b) capillary water
(c) hygroscopic water (d) combined water

4. Plasmolysis occurs when the cell is placed in
(a) isotonic solution (b) hypotonic solution
(c) hypertonic solution (d) None of the above

5. The rate of transpiration in plants is dependent upon
(a) temperature and soil
(b) light and temperature
(c) wind, temperature and light
(d) light, temperature, atmospheric humidity and wind

6. The water potential and osmotic potential of pure water are
(a) zero and zero (b) 100 and 100
(c) zero and 100 (d) 100 and zero

7. Stomata open and close due to
(a) circadian rhythm
(b) genetic clock
(c) pressure of gases inside the leaves
(d) turgor pressure of guard cells

8. Movement of ions or molecules in a direction opposite to that of prevailing electrochemical gradient is known as
(a) diffusion (b) active transport
(c) pinocytosis (d) brownian movement

9. Osmosis means movement of
(a) solute from lower concentration to higher concentration.
(b) solute from higher concentration to lower concentration.
(c) solvent from low concentration of solution to higher concentration of solution.
(d) solvent from higher concentration of solution to low concentration of solution.

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	

Space for Rough Work

10. Solution outside a cell has higher concentration than cytoplasm, then the solution is
(a) isotonic (b) acidic
(c) hypotonic (d) hypertonic

11. Which of the following is used as antitranspirant?
(a) Calcium carbonate
(b) Phenyl mercuric acetate
(c) Cobalt chloride
(d) Naphthol acetic acid

12. During $Na^+ - K^+$ pump
(a) $3Na^+$ and $2K^+$ are transported
(b) $1Na^+$ and $2K^+$ are transported
(c) $3Na^+$ and $3K^+$ are transported
(d) Depends on requirement of cell

13. In rainy season, door gets swelled due to
(a) imbibition (b) diffusion
(c) transpiration (d) respiration

14. Turgor pressure become equal to the wall pressure when
(a) water leaves the cell
(b) water enter the cell
(c) no exchange of water takes place
(d) solute goes from cell into water

15. Addition of a solute to pure water causes
(a) negative water potential.
(b) more negative water potential.
(c) positive water potential.
(d) more positive water potential.

16. Which one of the following process help the water- soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts?
(a) Fragmentation (b) Leaching
(c) Catabolism (d) Humification

17. Water logging of soil makes it physiologically dry because:
(a) this condition does not allow the capillary force to work
(b) this condition does not allow oxygen to enter the soil
(c) Both (a) and (b)
(d) None of the above

18. The productivity of a crop declines when leaves begin to wilt mainly because
(a) the chlorophyll of wilting leaves decomposes.
(b) flaccid mesophyll cells are incapable of photosynthesis.
(c) stomata close, preventing CO_2 from entering the leaf.
(d) photolysis, the water-splitting step of photosynthesis, cannot occur when there is a water deficiency.

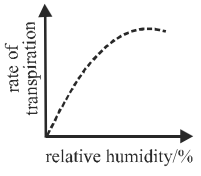
19. The phenomenon of plasmolysis is evident when cells are kept in
(a) hypotonic solution
(b) hypertonic solution
(c) isotonic solution
(d) None of the above

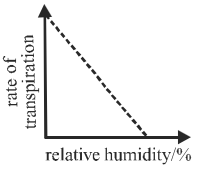
20. What mechanism explains the movement of sucrose from source to sink ?
(a) Evaporation of water and active transport of sucrose from sink.
(b) Osmotic movement of water into the sucrose loaded sieve tube cells creating a higher hydrostatic pressure into the source than in the sink.
(c) Tension created by differences in hydrostatic pressure in the source and sink.
(d) Active transport of sucrose through the sieve tube membranes driven by proton pump.

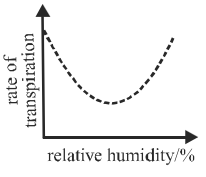
21. Water will be absorbed by root hairs when
(a) concentration of salt in the soil is high.
(b) concentration of solutes in the cell sap is high.
(c) plant is rapidly respiring.
(d) they are separated from soil by a permeable membrane.

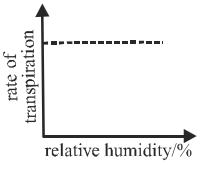
22. Proton pumps in the plasma membranes of plant cells may
(a) generate a membrane potential that helps drive cations into the cell through their specific carriers.
(b) be coupled to the movement of K^+ into guard cells.
(c) drive the accumulation of sucrose in sieve-tube members.
(d) be involved in all of the above

23. Which one of the following graphs most closely represents the relationship between the rate of transpiration of a mesophytic leaf and the atmospheric humidity ?

(a) 

(b) 

(c) 

(d) 

RESPONSE GRID					
	10. ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ
	15. ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ
	20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	

Space for Rough Work

24. A plant cell placed in pure water will
(a) expand until the osmotic potential or solute potential reaches that of water.
(b) becomes more turgid until the pressure potential of cell reaches its osmotic potential.
(c) become more turgid until the osmotic potential reaches that of pure water.
(d) becomes less turgid until the osmotic potential reaches that of pure water.

25. The casparian strip prevents water and minerals from entering the stele through the
(a) plasmodesmata (b) apoplast
(c) symplast (d) xylem vessel

26. If a soft stemmed plant, is cut horizontally near the base of its stem with a sharp blade on early morning of a humid day, drops of solution ooze through cut stem. This is due to
(a) guttation (b) bleeding
(c) transpiration pull (d) root pressure

27. Which of the following statements is incorrect?
(a) Endodermis is impervious to water due to the presence of suberized Casparian stips.
(b) Xylem vessels and tracheids, being non-living, are parts of the apoplast
(c) Ascent of sap is best explained by root pressure theory.
(d) None of these

28. In part A of a plant, sugars are actively transported into the phloem tissue. In part B, sugars are actively transported out of the phloem. Which way will the phloem sap move under these conditions?
(a) From A to B
(b) From B to A
(c) First from A to B; then, once the pressure builds up, from B to A
(d) First from B to A; then, once the pressure builds up, from A to B

29. If the pressure potential is +0.16 megapascals (mPa) and the osmotic potential is –0.24 megapascals, then the water potential would be
(a) + 0.4 mPa (b) +0.08 mPa
(c) – 0.08 mPa (d) + 0.16 mPa.

30. The movement of water up the stems of tall plants is least dependent on which of the following factors ?
(a) Guttation
(b) Transpiration
(c) Cohesiveness of water molecules
(d) Tension within column of water molecules

31. As a leaf loses water, a series of events typically occurs leading to the closing of stomata. Which of the following shows the correct sequence of these events ?
(a) Potassium ions enter guard cells, water passively enters guard cells, abscisic acid is released by leaf cells, pressure potential in guard cells decreases
(b) Potassium ions enter guard cells, water passively leaves guard cells, pressure potential in guard cells decreases
(c) Water passively leaves guard cells, pressure potential in guard cells decreases, abscisic acid is released by leaf cells, potassium ions leave guard cells
(d) Abscisic acid is released by leaf cells, potassium ions leave guard cells, water passively leaves guard cells, pressure potential in guard cells decreases

32. Which of the following explains why the leaf cells of plants within the family Crassulaceae have a lower pH at night than during the day ?
(a) These plants keep their stomata open at night but clossed during the day.
(b) Carbon dioxide in these plants is chemically fixed in orgnanic acids during the night, but these acids are metabolized during the day.
(c) These plants have a buildup of abscisic acid at night.
(d) Because their stomata are closed during the day, excess carbon dioxide within the leaf forms carbonic acid.

33. Which of the following characteristics applies to both xylem and phloem transport ?
(a) Follows a water potential gradient
(b) Involves only living cells
(c) Can occur in both directions
(d) Involves active transport of solute with passive movement of water

34. Which of the following cell types would be the third cell type a sugar molecule is likely to encounter on its route from its site of production in a chloroplast to its site of storage in the root ?
(a) Mesophyll cell
(b) Companion cell
(c) Sieve tube element
(d) Parenchyma

35. The primary difference between the apoplast and the symplast is that the
(a) apoplast is nonliving spaces and cell walls.
(b) apoplast relies on active transport.
(c) symplast is nonliving spaces and cell walls.
(d) apoplast prevents passive diffusion.

RESPONSE GRID					
	24. ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ
	29. ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ
	34. ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ			

Space for Rough Work

36. Tension is a result of which of the following?
(a) Transpiration at the leaf surface
(b) The cohesive nature of water
(c) The narrowness of the xylem tube
(d) All of the above

37. Which of the following regulates stomatal opening and closing ?
(a) Abscisic acid levels
(b) Light levels
(c) Carbon dioxide concentrations
(d) All of the above

38. Regulators of stomatal opening and closing work by activating the
(a) proton pump in guard cells.
(b) proton pump in stomata
(c) sodium-potassium pump
(d) all of the above

39. Which of the following would not contribute to water uptake by a plant cell ?
(a) an increase in the water potential (ψ) of the surrounding solution
(b) a decrease in pressure on the cell exerted by the wall
(c) the uptake of solutes by the cell
(d) an increase in tension on the surrounding solution.

40. Which of the following does not appear to involve active transport across membranes?
(a) the movement of mineral nutrients from the apoplast to the symplast
(b) the movement of sugar from mesophyll cells into sieve-tube members in corn
(c) the movement of sugar from one sieve-tube member to the next
(d) K^+ uptake by guard cells during stomatal opening.

41. The productivity of a crop declines when leaves begin to wilt mainly because
(a) the chlorophyll of wilting leaves decomposes.
(b) flaccid mesophyll cells are incapable of photosynthesis
(c) stomata close, preventing CO_2 from entering the leaf.
(d) photolysis, the water-splitting step of photosynthesis, cannot occur when there is a water deficiency

42. Imagine cutting a live twig from a tree and examining the cut surface of the twig with a magnifying glass. You locate the vascular tissue and observe a growing droplet of fluid exuding from the cut surface. This fluid is probably
(a) phloem sap
(b) xylem sap
(c) guttation fluid
(d) fluid of the transpiration stream

43. Xylem moves its materials
(a) from the leaves to the roots.
(b) from the roots to the leaves.
(c) when the plant is actively photosynthesizing.
(d) if the proper pressure is maintained.

44. Primary and secondary active transport both
(a) Generate ATP
(b) Use ATP directly
(c) Can move solutes against their concentration gradient
(d) Include the passive movement of glucose molecule

45. Aquaporins are
(a) cytoplasmic connections between cortex cells.
(b) openings in the lower epidermis of leaves through which water vapour escapes.
(c) openings into root hairs through which water enters.
(d) water specific channels in membranes that may regulate the rate of osmosis.

RESPONSE GRID					
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 11 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB12

SYLLABUS : Mineral Nutrition

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which of the following is a free living aerobic non-photosynthetic nitrogen-fixer?
(a) *Rhizobium* (b) *Azotobacter*
(c) *Azospirillum* (d) *Nostoc*

2. Which element is located at the centre of the porphyrin ring in chlorophyll ?
(a) Manganese (b) Calcium
(c) Magnesium (d) Potassium

3. Which one of the following mineral elements plays an important role in biological nitrogen fixation ?
(a) Molybdenum (b) Copper
(c) Manganese (d) Zinc

4. Leghaemoglobin helps in
(a) nitrogen fixation
(b) protecting nitrogenase from O_2
(c) destroys bacteria
(d) transport of food in plants

5. 'Whip-tail' disease in cauliflower is noted due to deficiency of
(a) manganese (b) magnesium
(c) molybdenum (d) nitrogen

6. Which of the following is correct set of micronutrient for plants?
(a) Mg, Si, Fe, Cu, Ca (b) Cu, Fe, Zn, B, Mn
(c) Mg, Fe, Zn, B, Mn (d) Mo, Zn, Cl, Mg, Ca

RESPONSE GRID	1. ⓐⓑⓒⓓ 2. ⓐⓑⓒⓓ 3. ⓐⓑⓒⓓ 4. ⓐⓑⓒⓓ 5. ⓐⓑⓒⓓ 6. ⓐⓑⓒⓓ

Space for Rough Work

7. Which of the following statements about nitrification is not true ?
(a) *Nitrobacter* oxidizes nitrite to nitrate.
(b) *Nitrosomonas* and *Nitrosococcus* convert ammonium ions to nitrite.
(c) Nitrification reactions are energy-producing (exergonic) reactions.
(d) Heterotrophic plants are more directly dependent on the nitrifying bacteria for usable nitrogen than autotrophic plants.

8. A free living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern *Azolla* is
(a) *Tolypothrix* (b) *Chlorella*
(c) *Nostoc* (d) *Anabaena*

9. *Azotobacter* and *Beijerinckia* are the examples of
(a) symbiotic nitrogen-fixers
(b) non-symbiotic nitrogen-fixers
(c) ammonifying bacteria
(d) disease causing bacteria

10. Which of the following is not performed by root hairs ?
(a) Water uptake (b) Oxygen uptake
(c) Mineral uptake (d) CO_2 uptake

11. The plant ash is an indication of.
(a) organic matter of plant.
(b) waste product.
(c) mineral salts absorbed by plants.
(d) None of the above

12. Plant obtains nitrogen from soil in the form of
(a) nitrite (b) nitrate
(c) ammonia (d) hydroxylamine

13. Hydroponics is
(a) nutrient less culture (b) water less culture
(c) soilless culture (d) none of these

14. Which element is required in the germination of pollen grain?
(a) Chlorine (b) Potassium
(c) Boron (d) Calcium

15. $N_2 + 8e^- + 8H^+ + 16\ ATP \rightarrow 2NH_4 + H_2 + 16ADP + 16Pi$
The above equation refers to
(a) ammonification (b) nitrification
(c) nitrogen fixation (d) denitrification

16. A trace element essential for plant growth and radio-isotope, which is used in cancer therapy is
(a) cobalt (b) calcium
(c) sodium (d) iron

17. Which one of the following elements in plants is not remobilised?
(a) Phosphorus (b) Calcium
(c) Potassium (d) Sulphur

18. Element necessary for middle lamella is
(a) Ca (b) Zn
(c) K (d) Cu

19. Which of the following element is necessary for translocation of sugars in plants ?
(a) Boron (b) Molybdenum
(c) Manganese (d) Iron

20. Plants die from prolonged water-logging because
(a) soil nutrients become very dilute.
(b) root respiration stops.
(c) cell sap in the plants becomes too dilute.
(d) nutrients leach down due to excess water.

21. Conversion of ammonia into nitrates through *Nitrosomonas* is called
(a) nitrogen fixation (b) nitrification
(c) denitrification (d) ammonification

RESPONSE GRID					
	7. (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)
	12. (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)
	17. (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)

Space for Rough Work

22. Which of the following is not a correct pairing of a macronutrient and the major functions it performs in the life of a plant ?
(a) Potassium-enzyme activation, water balance, ion balance.
(b) Calcium-activity of membranes and cytoskeleton, second messenger.
(c) Sulphur-in proteins and coenzymes.
(d) Iron-in active sites of many redox enzymes and electron carriers.

23. Which of the following minerals activate the enzymes involved in respiration?
(a) nitrogen and phosphorus
(b) magnesium and manganese
(c) potassium and calcium
(d) sulpur and iron

24. Soil can easily become deficient in_____ because these ions are negatively charged and do not stick to negatively charged clay particles.
(a) Nitrate (b) Calcium
(c) Ammonium (d) Magnesium

25. Legumes' roots have swellings called nodules that
(a) produce antibiotics that protect the plant from soil bacteria
(b) provide a steady supply of sugar to the host plant
(c) increases the surface area for water uptake
(d) contain nitrogen-fixing bacteria

26. Macronutrients are_____ than micronutrients.
(a) Larger molecules
(b) Needed in greater quantities
(c) More essential
(d) More important for growth

27. 'Hunger signs' in plants are :
(a) Symptoms due to lesser water absorption in plants
(b) Sympotms due to poor photosynthesis in plants
(c) Deficiency symptoms of particular mineral nutrients
(d) None of the above

28. Death of stem and root tips occur due to deficiency of :
(a) Calcium (b) Nitrogen
(c) Carbon (d) Phosphorus

29. Which of the following is not involved in the phenomenon called ion exchange ?
(a) Negatively charged clay particles
(b) pH
(c) Cations like K^+, Mg^{2+}, and Ca^{2+}
(d) H_2S

30. Tea yellow is a disease of tea plants produced due to the deficiency of-
(a) Nitrogen (b) Sulphur
(c) Potassium (d) Phosphorus

31. Nitrogenase
(a) is insensitive to oxygen.
(b) contains magnesium
(c) releases two NH_3 molecules as products.
(d) requires an aerobic environment.

32. Deficiency of iron causes :
(a) interveinal chlorosis first on young leaves
(b) decrease in protein synthesis
(c) reduced leaves and stunted growth
(d) bending of stem tip

33. You notice that the young leaves of your tomato plants are very yellow. What type of deficiency does this suggest ?
(a) Nitrogen (b) Carbon
(c) Water (d) Iron

RESPONSE GRID					
	22. ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ
	27. ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ			

Space for Rough Work

34. Where does most nutrient uptake occur in roots ?
(a) At the root tip, where root tissue first encounters soil away from the zone of nutrient depletion.
(b) At the casparian strip, where ions must enter the symplast prior to entering xylem cells.
(c) In the symplastic and apoplastic pathways.
(d) In root hairs and in the zone of maturation.

35. It is possible to determine whether an element is essential by observing growth of plants
(a) On soil in which the particular element is removed
(b) On soil in which only the particular element is present
(c) On an inert medium to which solution of only the particular element is added
(d) On an inert medium to which a nutrient solution excluding that particular element, is added.

36. Terrestrial plants obtain all of the following nutrients from the soil except
(a) potassium (b) nitrogen
(c) phosphorus (d) carbon

37. For chlorophyll formation a plant needs :
(a) Fe, Ca & light (b) Fe, Mg & Light
(c) Ca, K & light (d) Mn & Cu

38. Which element essential for the stability of chromosome structure?
(a) Zn (b) Ca
(c) Mo (d) Fe

39. Which mineral nutrients are called critical element for crops?
(a) N, P, K (b) C, H, O
(c) N, S, Mg (d) K, Ca, Fe

40. Nitrogenase enzymes are extremely sensitive to _____ molecules -
(a) Hydrogen (b) Oxygen
(c) Water (d) CO_2

41. Gray spots of Oat are caused by deficiency of :
(a) Cu (b) Zn
(c) Mn (d) Fe

42. Which element participates in photolysis of water, ionic balance maintenance and solute concentration?
(a) Cl^- (b) B
(c) Na^+ (d) Mg^{2+}

43. "Reclamation" and "Little leaf" disease, caused by deficiency of
(a) Zn and Mo (b) Cu and Zn
(c) Cu and B (d) Mn and Cu

44. Brown heart rot of beets is due to deficiency of
(a) B (b) P
(c) Mg (d) Mo

45. Which element is related with Khaira disease of paddy & auxin synthesis?
(a) Fe (b) Zn
(c) B (d) Cu

RESPONSE GRID					
	34. ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ
	39. ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ
	44. ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ			

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 12 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB13

SYLLABUS : Photosynthesis in Higher Plants

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Quantasomes are present in
(a) chloroplast (b) mitochondria
(c) golgi body (d) lysosome

2. The C_4 plants are photosynthetically more efficient than C_3 plants because:
(a) the CO_2 compensation point is more
(b) CO_2 generated during photorespiration is trapped and recycled through PEP carboxylase
(c) the CO_2 efflux is not prevented
(d) they have more chloroplasts

3. Photorespiration is favoured by
(a) high O_2 and low CO_2
(b) low light and high O_2
(c) low temperature and high O_2
(d) low O_2 and high CO_2

4. Which one is the correct summary equation of photosynthesis?
(a) $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{energy}$
(b) $C_6H_{12}O_6 + 6O_2 + 6H_2O \longrightarrow 6CO_2 + 12H_2O + \text{energy}$
(c) $6CO_2 + 6H_2O \longrightarrow 6H_2O + C_6H_{12}O_6$
(d) $6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} 6O_2 + C_6H_{12}O_6 + 6H_2O$

5. C_4 acid, formed in the mesophyll of C_4 plants leaf during photosynthesis is
(a) OAA or malic acid or aspartic acid
(b) pyruvic acid
(c) succinic acid
(d) fumaric acid

6. The organelles which take part in photo-respiration are
(a) chloroplast, mitochondria, nucleus
(b) chloroplast, mitochondria, lysosome
(c) mitochondria, chloroplast, peroxisome
(d) mitochondria, lysosomes, peroxisome

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
	6. ⓐⓑⓒⓓ				

Space for Rough Work

7. Grana are present inside the :
(a) mitochondria (b) chloroplast
(c) endoplasmic reticulum (d) ribosome

8. Photosynthetically active radiation is represented by the range of wavelength of
(a) 340 - 450 nm (b) 400 - 700 nm
(c) 500 - 600 nm (d) 400 - 950 nm

9. Which of the following statement is incorrect ?
(a) C_3 plants respond to higher temperature, show higher photosynthetic rate while C_4 plants have lower optimum temperature.
(b) Tropical plants have higher temperature optimum than the plants adapted to temperate climate.
(c) Light reaction is less temperature sensitive than dark reaction.
(d) The effect of water as a factor is more through its effect on plant, rather than directly on photosynthesis.

10. Chemiosmotic hypothesis given by Peter Mitchell proposes the mechanism of
(a) synthesis of ATP (b) synthesis of $FADH_2$
(c) synthesis of NADH (d) synthesis of NADPH

11. RuBisCO stands for
(a) Ribulose Biphosphate Carboxylase Oxygenase
(b) Ribulose Phosphate Carboxylase Oxygenase
(c) Ribulose Phosphate Carboxylic Oxygenase
(d) None of the above

12. Which enzyme is most abundantly found on earth?
(a) Catalase (b) RuBisCo
(c) Nitrogenase (d) Invertase

13. The first carbon dioxide acceptor in C_4-plants is
(a) Phosphoenol-pyruvate
(b) Ribulose 1, 5-diphosphate
(c) Oxalo-acetic acid
(d) Phosphoglyceric acid

14. Which one of the following is essential for photolysis of water ?
(a) Manganese (b) Zinc
(c) Copper (d) Boron

15. Which element is required in the germination of pollen grain?
(a) Chlorine (b) Potassium
(c) Boron (d) Calcium

16. In a CAM plant, the concentration of organic acid
(a) increases during the day.
(b) decreases during the day.
(c) increases during night.
(d) decreases or increases during day.

17. Which of the following statements regarding photorespiration are **true**?
(a) Photorespiration is a metabolically expensive pathway.
(b) Photorespiration is avoided when CO_2 is abundant.
(c) Photorespiration results in a loss of usable carbon dioxide.
(d) All of the above

18. The Z-scheme refers to
(a) the type of photosynthesis occurs in plants found in areas with minimal precipitation.
(b) the pattern of grana within the chloroplasts of photosynthetic plants.
(c) the carbon-fixation process which is also known as the Calvin cycle.
(d) an energy diagram for the transfer of electrons in the light reactions of photosynthesis in plants.

19. Which one is a C_4-plant?
(a) Papaya (b) Pea
(c) Potato (d) Maize/Corn

20. In an experiment, mature leaves on the plant were enclosed for a fixed amount of time in a transparent bag that had radioactive CO_2. In which part of the plant will maximum radioactivity be found after some time?
(a) Actively growing leaves.
(b) Guard cells of all the leaves.
(c) In mature leaves.
(d) Senescing leaves and roots.

21. When a photosynthetic plant is transferred to an atmosphere of enriched O_2, its rate of
(a) photosynthesis would increase.
(b) photosynthesis would decrease.
(c) respiration would decrease.
(d) osmosis would increase.

RESPONSE GRID					
	7. (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)
	12. (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)
	17. (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)

Space for Rough Work

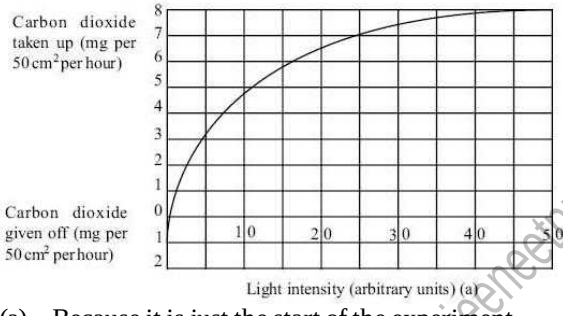
22. In C_4 plants, agranal chloroplasts are found in
(a) mesophyll cells
(b) epidermal cell chloroplasts of green stem
(c) bundle sheath cells
(d) chloroplasts of guard cells

23. Oxysomes or $F_0 - F_1$ particles occur on
(a) thylakoids
(b) mitochondrial surface
(c) inner mitochondrial membrane
(d) chloroplast surface

24. Photorespiration is favoured by
(a) high O_2 and low CO_2
(b) low light and high O_2
(c) low temperature and high O_2
(d) low O_2 and high CO_2

25. In the leaves of C_4 plants, malic acid formation during CO_2 fixation occurs in the cells of
(a) bundle sheath (b) phloem
(c) epidermis (d) mesophyll

26. The graph shows the relation between light intensity and the giving off and taking up of carbon dioxide by the leaves of a plant. Why is most carbon dioxide given off when the light intensity is zero units ?

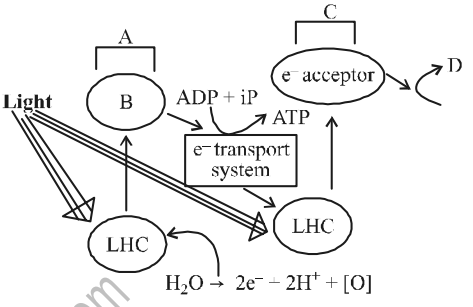


(a) Because it is just the start of the experiment.
(b) Only respiration is taking place at this intensity of light.
(c) Only photosynthesis is taking place at this intensity of light.
(d) The rate of photosynthesis is equivalent to the rate of respiration.

27. In photosystem-I the first electron acceptor is
(a) cytochrome (b) plastocyanin
(c) an iron-sulphur protein (d) ferredoxin

28. Which of the following statement is false?
(a) H_2S, not H_2O, is involved in photosynthesis of purple sulphur bacteria.
(b) Light and dark reactions are stopped in the absence of light.
(c) Calvin cycle occurs in the grana of chloroplast.
(d) ATP is produced during light reaction *via* chemiosmosis.

29. Given below is the pathway of light reaction. Identify the given blanks indicated by A, B, C, D and E.



	A	B	C	D
(a)	P-700	H^+ acceptor	P680	$NADP^+$
(b)	Photosystem I	e^- acceptor	Photosystem II	$NADPH_2$ + ATP
(c)	Photosystem II	H^+ acceptor	P700	NADPH
(d)	Photosystem II	e^- acceptor	Photosystem I	NADPH + H^+

30. Warburg effect refers to
(a) decreased photosynthetic rate at very high O_2 concentration
(b) increased photosynthetic rate at very high O_2 concentration
(c) decreased photosynthetic rate at very low O_2 concentration
(d) increased photosynthetic rate at very low O_2 concentration

RESPONSE GRID					
	22. ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ
	27. ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	

Space for Rough Work

31. Read the following statements and select the correct ones.
(i) PS I is involved in non-cyclic photophosphorylation only.
(ii) PS II is involved in both cyclic and non-cyclic photophosphorylation
(iii) Stroma lamellae membranes possess PS I only, whereas grana lamellae membranes possess both PS I and PS II.
(a) (i) only (b) (ii) only
(c) (iii) only (d) (i), (ii) and (iii)

32. Which is not correct for cyclic photophosporylation ?
(a) No O_2 given off
(b) No water consumed
(c) No $NADPH_2$ synthesized
(d) PS–I and PS–II are involved

33. Calvin cycle expends the following for fixation of 3-molecules of CO_2
(a) 9 ATP and 6 $NADPH_2$ (b) 8 ATP and 6 $NADPH_2$
(c) 9 ATP and 3 $NADPH_2$ (d) 6 ATP and 9 $NADPH_2$

34. In a classic experiment on photosynthesis, R. L. Hill demonstrated that an illuminated in *vitro* suspension of isolated chloroplasts could produce oxygen in the presence of a hydrogen acceptor such as methylene blue. In this case methylene blue is reduced. Which one of the following compounds replaces methylene blue in the intact photosynthesising plant ?
(a) adenosine triphosphate (ATP)
(b) carbon dioxide
(c) nicotinamide adenine dinucleotide phosphate (NADP)
(d) phosphoglyceric acid (PGA)

35. The key compound of Calvin cycle is
(a) PGA (b) PGAL
(c) DHAP (d) DPGA

36. Which one of the following is a correct outline of the main events in photosynthesis?
(a) Oxygen reacts with a carbohydrate to produce water and carbon dioxide in the presence of light.
(b) Light joins carbon dioxide to an acceptor compound which is then reduced by hydrogen obtained from water.
(c) Light splits water and the resulting hydroxyl group combines with a compound which has incorporated carbon dioxide
(d) Carbon dioxide combines with an acceptor compound and this is reduced by hydrogen split from water by light.

37. Who used prism, white light, green alga, *Cladophora* and aerobic bacteria and plotted the action spectra for photosynthesis?
(a) Sachs (b) Arnon
(c) Arnold (d) Englemann

38. Which one of the following pigment does not occur in the chloroplast?
(a) Carotene (b) Xanthophyll
(c) Chlorophyll '*b*' (d) Anthocyanin

39. Which pigment is water soluble?
(a) Chlorophyll (b) Carotene
(c) Anthocyanin (d) Xanthophyll

40. Generally CO_2 is not limiting for hydrophytes –
(a) Mesophytes plants fix H_2S in their photosynthesis.
(b) These plants also CO_2 have from water in the form of HCO_3.
(c) Glucose is not required for their respiration
(d) All of the above

41. Suspension of isolated thylakoids in culture medium containing CO_2 and H_2O does not produce hexose due to absence of
(a) ATP (b) Enzyme
(c) Proteins (d) Hill reagent

42. Stroma in the chloroplasts of higher plant contains
(a) Light-independent reaction enzymes
(b) Light-dependent reaction enzymes
(c) Ribosomes
(d) Chlorophyll

43. The light harvesting complex (LHC) is made up of
(a) one molecule of chl *a*.
(b) very few molecules of chl *a*.
(c) hundreds of pigment molecules bound to proteins.
(d) Chl *a* + Chl *c* + protein + DNA.

44. Hatch and Slack pathway (HSK pathway) is otherwise known as C_4-cycle because
(a) the first stable product is oxaloacetic acid / OAA which is a C_4-compound.
(b) the primary CO_2 acceptor is OAA, a C_4-compounds.
(c) all intermediate metabolites are C_4-compound.
(d) at one time $4CO_2$ molecules take part in carboxylation pathway.

45. The first acceptor of electrons from an excited chlorophyll molecule of photosystem II is –
(a) Quinone (b) Cytochrome
(c) Iron-sulphur protein (d) Ferredoxin

RESPONSE GRID					
	31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 13 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB14

SYLLABUS : Respiration in Plants

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Respiratory Quotient (R.Q.) is defined as:
(a) vol. of O_2/vol. of CO_2
(b) vol. of CO_2 /vol. of O_2
(c) vol. of O_2/vol. of N_2
(d) vol. of N_2/vol. of CO_2

2. What is the end product of glycolysis of a glucose molecule?
(a) Fructose 1, 6- diphosphate
(b) Pyruvate and ATP
(c) Phosphoglyceraldehyde
(d) Lactic acid and ATP

3. Connecting link between glycolysis and Krebs cycle is/ before entering Krebs cycle pyruvate is changed to
(a) oxaloacetate (b) phosphoenol pyruvate
(c) pyruvate (d) acetyl CoA

4. Site of respiration in bacteria is
(a) episome (b) ribosome
(c) mesosome (d) microsome

5. Terminal cytochrome of respiratory chain which donates electrons to oxygen is
(a) Cyt. b (b) Cyt. c
(c) Cyt. a_1 (d) Cyt. a_3

6. Which of the following processes make direct use of oxygen ?
(a) Glycolysis (b) Fermentation
(c) Electron transport (d) citric acid cycle

7. Glycolysis is a
(a) redox process (b) aerobic process
(c) oxidative process (d) reductive process

8. In Kreb's cycle, the FAD participates as electron acceptor during the conversion of
(a) succinyl CoA to succinic acid
(b) α - ketoglutarate to succinyl CoA
(c) fumaric acid to malic acid
(d) succinic acid to fumaric acid

9. The major reason that glycolysis is not as energy productive as respiration is that
(a) NAD^+ is regenerated by alcohol or lactate production, without the high-energy electrons passing through the electron transport chain.
(b) it is the pathway common to fermentation and respiration.
(c) it does not take place in a specialized membrane-bound organelle.
(d) pyruvate is more reduced than CO_2; it still contains much of the energy from glucose.

RESPONSE GRID					
	1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
	6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	

Space for Rough Work

10. Which of the following is a 4-carbon compound?
(a) Oxaloacetic acid (b) Citric acid
(c) Phosphoglyceric acid (d) Phosphoenol pyruvate

11. Which of the following is a biological uncoupler of oxidative phosphorylation ?
(a) Thermogenin
(b) 2, 4 – Dichlorophenoxy acetic acid
(c) 2, 4 – Dinitrophenol
(d) Ethylene diaminotetra acetic acid

12. Which of the following is not true for oxidative phosphorylation?
(a) It uses oxygen as the initial electron donor.
(b) It involves the redox reactions of electron transport chain.
(c) It involves an ATP synthase located in the inner mitochondrial membrane.
(d) It depends on chemiosmosis.

13. In which of the following reaction of glycolysis, a molecule of water is removed from the substrate ?
(a) Frucoste-6-phosphate $\rightarrow$ Fructose 1, 6-biphosphate
(b) 3-phosphate glyceraldehyde $\rightarrow$ 1, 3 biphosphoglyceric acid
(c) Phosphoenol-pyruvate $\rightarrow$ Pyruvic acid
(d) 2-phosphoglycerate $\rightarrow$ PEP

14. The first dicarboxylic acid in Krebs' cycle is
(a) isocitric acid (b) pyruvic acid
(c) oxalo acetic acid (d) α-ketoglutaric acid

15. Final electron acceptor in oxidative phosphorylation is
(a) hydrogen (b) dehydrogenase
(c) cytochrome (d) oxygen

16. Quantasomes are found in
(a) mitochondria (b) chloroplast
(c) lysosome (d) endoplasmic reticulum

17. Which of the following statement(s) is/are incorrect ?
(i) Proton channel of oxysome / complex V / ATP synthase is located in F_1.
(ii) Metabolic water is produced in terminal oxidation / produced in respiration.
(iii) CoQ accepts electron from NADH dehydrogenase (complex I) and also can accept electron from $FADH_2$/ succinate Q-reductase / complex II.
(iv) Cytochrome *c* is a small protein attached to outer surface of the inner mitochondrial membrane and acts as mobile carrier for transfer of electrons between complex I (Cyt *bc*, complex) and III.
(v) Complex IV refers to cytochrome *c* oxidase (cyt *a*, a_3 and 2 Cu per centre).
(vi) If a cell is treated with a drug that inhibits ATP synthase, the pH of mitochondrial matrix will increase.
(a) (i), (ii) and (iii) (b) (iii), (v) and (vi)
(c) (i) and (iv) (d) Only (iii)

18. Which of the following is an important intermediate found in all the types of respiration ?
(a) Acetyl CoA (b) Pyruvic acid
(c) Oxaloacetate (d) Tricarboxylic acid

19. Incomplete oxidation of glucose into pyruvic acid with several intermediate steps is known as
(a) TCA-pathway (b) Glycolysis
(c) HMS-pathway (d) Krebs cycle

20. Common enzyme in glycolysis and pentose phosphate pathways is
(a) hexokinase (b) aconitase
(c) fumarase (d) dehydrogenase

21. Out of 36 ATP molecules produced per glucose molecule during respiration
(a) 2 are produced outside glycolysis and 34 during respiratory chain.
(b) 2 are produced outside mitochondria and 34 inside mitochondria.
(c) 2 during glycolysis and 34 during Krebs cycle.
(d) all are formed inside mitochondria.

22. R.Q. is highest when respiratory substance is
(a) fat (b) malic acid
(c) glucose (d) protein

23. Electron transport chain is inhibited by
(a) rotenone and amytal
(b) antimycin-A
(c) cyanide (CN^-), azide (N^{3-}) and carbon monoxide (CO)
(d) All of the above

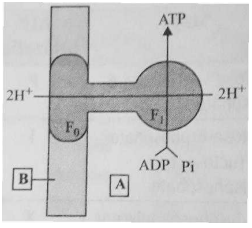
24. Though vertebrates are aerobes, but their (i) show anaerobic respiration during (ii). During this, (iii) of skeletal muscle fibres is broken down to release lactic acid and energy. Lactic acid, if accumulates causes muscle fatigue.
Fill up the blanks in the above paragraph and select the correct option.

	(i)	(ii)	(iii)
(a)	skeletal muscles	heavy exercise	glucose
(b)	skeletal muscles	mild exercise	glycogen
(c)	skeletal muscles	heavy exercise	glycogen
(d)	cardiac muscles	heavy exercise	glycogen

RESPONSE GRID					
	10. (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)
	15. (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)
	20. (a)(b)(c)(d)	**21.** (a)(b)(c)(d)	**22.** (a)(b)(c)(d)	**23.** (a)(b)(c)(d)	**24.** (a)(b)(c)(d)

Space for Rough Work

25. Identify A and B in the given diagram showing ATP synthesis in oxysomes



(a) A = Mitochondrial matrix
B = Outer mitochondrial membrane
(b) A = Mitochondrial matrix
B = Inner mitochondrial membrane
(c) A = Cell cytoplasm
B = Inner mitochondrial membrane
(d) A = Cell cytoplasm
B = Outer mitochondrial membrane

26. Potassium cyanide is known to interfere with the formation and use of ATP in cell metabolism.
If the use of potassium cyanide resulted in an accelerated entry of a solute into a cell, it may be reasonably assumed that, under normal circumstances, the solute enters by
(a) active transport (b) osmosis
(c) passive diffusion (d) pinocytosis

27. When yeast growing anaerobically in glucose-rich-environment is exposed to oxygen in sufficient quantity, its rate of glucose utilization decreases. This pheno-menon is known as the Pasteur effect. Adding an uncoupler of oxidative phosphorylation would have what effect on Pasteur effect?
(a) Pasteur effect will be enhanced
(b) Pasteur effect will remain unchanged
(c) Pasteur effect will not take place
(d) Variable effect

28. An inhibitor is added to a cell culture so that succinate accumulates. The enzyme catalysing the formation of which substance has been blocked?
(a) Citrate (b) Oxaloacetate
(c) α -ketoglutarate (d) Fumarate

29. One of the following is common to glycolysis as well as Krebs cycle in eukaryotes :
(a) Substrate level phosphorylation
(b) Photophosphorylation
(c) Localization in mitochondria
(d) Production of $FADH_2$

30. A mutant cell lacking mitochondria will show:
(a) Inability to oxidize carbohydrates
(b) Inability to oxidize fats
(c) Inability to oxidize carbohydrates and fats
(d) Inability to synthesize glucose

31. During the early stages of alcoholic fermentation there is a high rate of growth of yeast. After some time the rate decreases. Which of the following conditions in the culture medium is least likely to have caused this?
(a) Depletion of glucose
(b) Depletion of oxygen
(c) Depletion of mineral salts
(d) Accumulation of waste products

32. Hexose monophosphate shunt does not take place when :
(a) Oxygen is not enough
(b) Glucose is the substrate
(c) NAD is available
(d) NAD is not available due to shortage of oxygen

33. Chemiosmotic theory of ATP synthesis in the chloroplasts and mitochondria is based on
(a) membrane potential (b) accumulation of Na ions
(c) accumulation of K ions (d) proton gradient

34. During the stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP
(a) glycolysis
(b) krebs cycle
(c) conversion of pyruvic acid to acetyl Co-A
(d) electron transport chain

35. How many ATP molecules could maximally be generated from one molecule of glucose, if the complete oxidation of one mole of glucose to CO_2 and H_2O yields 686 kcal and the useful chemical energy available in the high energy phosphate bond of one mole of ATP is 12 kcal ?
(a) Thirty (b) Fifty-seven
(c) One (d) Two

36. All enzymes of TCA cycle are located in the mitochondrial matrix except one which is located in inner mitochondrial membranes in eukaryotes and in cytosol in prokaryotes. This enzyme is
(a) isocitrate dehydrogenase
(b) malate dehydrogenase
(c) succinate dehydrogenase
(d) lactate dehydrogenase.

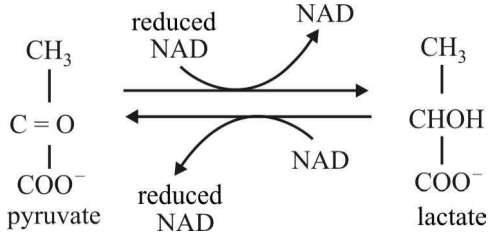
37. The energy-releasing process in which the substrate is oxidised without an external electron acceptor is called
(a) fermentation (b) photorespiration
(c) aerobic respiration (d) glycolysis

RESPONSE GRID					
	25. (a)(b)(c)(d)	**26.** (a)(b)(c)(d)	**27.** (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)
	30. (a)(b)(c)(d)	**31.** (a)(b)(c)(d)	**32.** (a)(b)(c)(d)	**33.** (a)(b)(c)(d)	**34.** (a)(b)(c)(d)
	35. (a)(b)(c)(d)	**36.** (a)(b)(c)(d)	**37.** (a)(b)(c)(d)		

Space for Rough Work

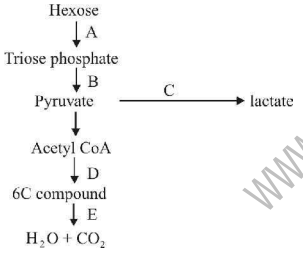
38. In TCA cycle the conversion of succinyl Co-A to succinic acid requires
(a) Acetyl Co-A + GTP + iP
(b) Acetyl Co-A + GDP + iP
(c) Co-A + GTP + iP
(d) GDP + iP

39. The diagram shows the reversible conversion of pyruvate to lactate by the enzyme lactate dehydrogenase.



What would be the effect of inhibition of lactate dehydrogenase in a mammalian cell under anaerobic conditions?
(a) A decrease in cell pH, due to the accumulation of lactic acid.
(b) A decrease in glycolysis, due to the lack of NAD.
(c) An increase in ATP production, due to increased amounts of reduced NAD.
(d) An increase in the activity of the Krebs cycle, due to increased amounts of pyruvate.

40. The diagram summarises the pathway of glucose breakdown.



When two steps result in a net increase of ATP?
(a) A and C (b) A and D
(c) B and D (d) B and E

41. $FADH_2$ is produced during the following reaction
(a) Succinic acid to fumaric acid
(b) Fumaric acid to malic acid
(c) Succinyl Co-A to succinic acid
(d) Isocitric acid to oxaloacetic acid

42. What is the function of molecular oxygen in cellular respiration?
(a) It causes the breakdown of citric acid.
(b) To combine with glucose to produce carbon dioxide.
(c) To combine with carbon from organic molecules to produce carbon dioxide.
(d) To combine with hydrogen from organic molecules to produce water.

43. Sugars are not as good as fats as a source of energy for cellular respiration, because sugars
(a) produce toxic amino groups when broken down.
(b) contain more hydrogen.
(c) usually bypass glycolysis and the Krebs cycle.
(d) contain fewer hydrogen atoms and electrons.

44. For bacteria to continue growing rapidly when they are shifted from an environment containing O_2 to an anaerobic environment, they must
(a) produce more ATP per mole of glucose during glycolysis.
(b) produce ATP during oxidation of glucose.
(c) increase the rate of glycolysis.
(d) increase the rate of TCA cycle.

45. Protein is used as respiratory substrate only when
(a) Carbohydrates are absent
(b) Fats are absent
(c) Both carbohydrates and fats are exhausted
(d) Fats and carbohydrates are abundant

RESPONSE GRID					
	38. ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ
	43. ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ		

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 14 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB15

SYLLABUS : Plant Growth and Development

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which one is a long day plant?
(a) Tobacco (b) *Glycine max*
(c) *Mirabilis jalapa* (d) Spinach

2. The hormone which controls cell division and cell differentiation is
(a) ABA (b) auxin
(c) gibberellin (d) cytokinin

3. Which one of the following is a long day plant?
(a) Bajra (b) Soyabean
(c) Tobacco (d) Wheat

4. A chemical believed to be involved in flowering is
(a) gibberellin (b) kinetin
(c) florigen (d) IBA

5. Which one of the following acids is a derivative of carotenoids ?
(a) Indole-3 -acetic acid (b) Gibberellic acid
(c) Abscisic acid (d) Indole butyric acid

6. Differentiation of shoot is controlled by
(a) high gibberellin : cytokinin ratio
(b) high auxin : cytokinin ratio
(c) high cytokinin : auxin ratio
(d) high gibberellin : auxin ratio

7. Which one of the following generally acts as an antagonist to gibberellins?
(a) Zeatin (b) Ethylene
(c) ABA (d) IAA

8. To avoid excessive water loss during severe drought stress, the closure of stomata is signalled by the production of
(a) IAA (b) NAA
(c) ABA (d) IBA

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ		

Space for Rough Work

9. In short day plants, flowering is induced by
(a) photoperiod less than 12 hours.
(b) photoperiod below a critical length and uninterrupted long night.
(c) long night.
(d) short photoperiod and interrupted long night.

10. Apical dominance in plants is caused by
(a) high concentration of auxins in the terminal bud.
(b) high concentration of gibberellins in the apical bud.
(c) high concentration of auxins in the lateral bud.
(d) absence of auxins and gibberellins in apical bud.

11. Primary precursor of IAA is
(a) phenylalanine (b) tyrosine
(c) tryptophan (d) leucine

12. In a plant growing under dark condition, the leaves turn light coloured, internodes become much elongated and it is termed as
(a) vernalization (b) etiolation
(c) phyllotaxy (d) chlorosis

13. Parthenocarpic fruit can be produced by the application of which of the following auxin?
(a) IBA (Indole butyric acid)
(b) IAA (Indole acetic acid)
(c) 2, 4-D (2-4 dichlorophenoxy acetic acid)
(d) All of the above.

14. The conditions necessary for vernalization are
(a) high temperature and water
(b) low temperature and oxygen
(c) water and carbon dioxide
(d) oxygen and water.

15. Which of the following hormones does not naturally occur in plants?
(a) 2,4–D (2, 4–dichloropheoxy acetic acid)
(b) IAA
(c) ABA
(d) GA

16. Which of the following types of phytohormones resemble the nucleic acids in some structural aspects ?
(a) Auxin (b) Cytokinin
(c) Gibberellin (d) ABA

17. Which one of the following statement regarding auxin is/ are correct?
(a) IAA and IBA are natural but NAA, 2, 4-D and 2, 4, 5-T are synthetic auxins.
(b) IAA and NAA are natural but IBA, 2, 4, 5-T and 2, 4-D are synthetic auxins.
(c) NAA and 2, 4, 5-T are natural but IAA, IBA and 2, 4-D are synthetic auxins.
(d) IAA, NAA, IBA, 2, 4-D and 2, 4, 5-T are synthetic auxins.

18. Which one among the following chemicals is used for causing defoliation of forest trees?
(a) Phosphon-D
(b) Malic hydrazide
(c) 2, 4-dichlorophenoxy acetic acid
(d) Amo-1618

19. Which of the following hormone prevents ripening of fruit?
(a) Gibberellin (b) Ethylene
(c) Cytokinin (d) ABA

20. Gibberellin was first extracted from
(a) *Gibberella fujikuroi* (b) *Gelidium*
(c) *Gracelaria* (d) *Aspergillus*

21. A plant completing its life cycle before the onset of dry condition is said to be
(a) short day plant (b) long day plant
(c) drought escaping (d) All of these

22. Phytohormones are
(a) chemicals regulating flowering.
(b) chemicals regulating secondary growth.
(c) hormones regulating growth from seed to adulthood.
(d) regulators synthesized by plants and influencing physiological processes.

RESPONSE GRID					
9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
19. (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)	**22.** (a)(b)(c)(d)	

Space for Rough Work

23. Which one of the following is a natural growth inhibitor?
(a) NAA (b) ABA
(c) IAA (d) GA

24. Select the incorrect statement among the following.
(a) Increase in growth per unit time is growth rate.
(b) A sigmoid growth curve is a characteristic of most living organisms in their natural environment.
(c) Rate of growth is constant during geometrical growth.
(d) Exponential phase is also called as log phase.

25. Cabbage is a biennial plant which produces flowers in second year of growth. In an attempt to make it flower in a single year, four potted plants (I, II, III and IV) of cabbage were subjected to different temperatures for several days as given in the table.

Potted plant	Temperature
I	5°C
II	20°C
III	30°C
IV	25°C

Which potted plant will show flowering?
(a) I (b) II
(c) III (d) IV

26. Etiolated seedlings are produced by germinating seeds and keeping them in total darkness. Under which of the following conditions will plants kept in the dark-begin to synthesize chlorophyll ?
(a) After being given a pulse of blue light
(b) After being given a pulse of red light
(c) After being given a pulse of red light followed by a pulse of far-red light
(d) After being given a pulse of far-red light followed by a pulse of red light

27. Which of the following may function to break dormancy in seeds ?
(a) Penetration of the seed coat
(b) Leaching of inhibitory compounds by water
(c) Exposure to fire
(d) All of the above

28. You have installed an outdoor gas burning grill on your back ratio next to your favorite camellia bush. After the first few chilly nights of using your grill you notice that your camellia, which does not normally lose its leaves, is beginning to do so. Which of the following is the best explanation for what is happening ?
(a) The bush is getting too warm next to your grill.
(b) Ethylene is a by-product of the gas you are burning and is causing senescence in your plant.
(c) Abscisic acid is a by-product of the gas you are burning and is causing senescence in your plant.
(d) The plant is a biennial and is bolting.

29. Cytokinins are known to :
(a) Inhibit cytoplasmic movement
(b) Help in retention of chlorophyll
(c) Influence water movement
(d) Promote abscission layer formation.

30. Which of the following schemes best represents how environmental cues are transduced to changes in a plant ?
(a) Receptors receive environmental cues, a signal transduction pathway is initiated, there is an alteration in the particular genes that are transcribed and translated and a cellular response is generated.
(b) Receptors are triggered, hormones are released, signal transduction pathways are initiated, there is an alteration in expression of genes and a cellular response is generated.
(c) Neither a nor b
(d) Both a and b

31. When a plant is not reproducing most of the cytokinins are produced in its :
(a) Lateral buds (b) Shoot apex
(c) Roots (d) Leaves

RESPONSE GRID					
	23. ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ
	28. ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	

Space for Rough Work

32. Which of the following light receptors is responsible for absorbing blue and ultraviolet light ?
(a) Phytochrome P_r (b) Photochrome P_{fr}
(c) Cryptochrome (c) Phototropin

33. Phototropic and geotropic movements in plants have been traced to be linked with:
(a) Enzymes (b) Starch
(c) Gibberellins (d) Auxins

34. The natural plant hormones were first isolated from :
(a) Corn germoil and human urine
(b) Cotton fruits, spinach leaves and rice plants
(c) Human urine and rice seedlings
(d) Spinach leaves and fungus Gibberella

35. Auxin regulates cell growth by which of the following mechanisms ?
(a) Altering the elasticity of cell walls
(b) Altering the plasticity of cell walls
(c) Synthesizing new cell walls
(d) Breaking down cell walls in growing cells

36. Which of the following were not observed in studies done on certain dwarf strains of plants ?
(a) Applications of extracts of normal strains promoted growth of dwarf strains.
(b) Dwarf strains grew normally if additional fertilizer was applied
(c) Application of gibberellin A1 promoted growth of dwarf strains
(d) Gibberellin caused little additional growth of normal strains.

37. The closure of lid of pitcher in pitcher plant is :
(a) A paratonic movement
(b) A tropic movement
(c) A turgor movement
(d) An autonomous movement

38. Which of the following instrument can be used to record plant growth by seconds?
(a) Arc auxanometer (b) Arc indicator
(c) Space marker disc (d) Crescograph

39. *Avena* coleoptile test to find out the quantity of growth promoting hormones was discovered by –
(a) F.W. Went (b) L.J. Oudus
(c) K.V. Thimann (d) F. Skoog

40. "Foolish seedling'' disease of rice led to the discovery of
(a) ABA (b) 2, 4-D
(c) IAA (d) GA

41. Which of the growth substance act as a stimulant during nodule formation in Leguminous plant ?
(a) Ethylene (b) ABA
(c) IAA (d) Morphactin

42. Indole-3 acetic acid called as auxin was first isolated from
(a) Human urine (b) Corn germ oil
(c) *Fusarium* (d) *Rhizopus*

43. Prunning of plants promotes branching, because the axillary buds get sensitized to –
(a) Ethylene (b) Gibberellin
(c) Cytokinin (d) IAA

44. Pineapple can be made to flower in off season by :
(a) Ethylene
(b) Zeatin
(c) Napthalene Acetic Acid (NAA)
(d) Temperature

45. Choose the wrongly matched pair from the following
(a) Auxins – "to grow"
(b) Gibberellins – "*Gibberella fujikuroi*"
(c) Cytokinins – Herring sperm DNA
(d) Abscisic acid – Flowering hormone

RESPONSE GRID					
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ
	37. ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ
	42. ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 15 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB16

SYLLABUS : Digestion and Absorption

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Dark purplish gland lying on the left side of abdomen is called :
(a) liver (b) spleen
(c) gall bladder (d) appendix

2. Which of the following are water soluble vitamins?
(a) B, C (b) A, D, K
(c) A, D, E, K (d) K, B, A, E

3. Jaundice is a disorder of
(a) Excretory system (b) Skin and eyes
(c) Digestive system (d) Circulatory system

4. Which one of the following pairs of food components in humans reaches the stomach totally undigested ?
(a) Starch and cellulose (b) Protein and starch
(c) Starch and fat (d) Fat and cellulose

5. Which of following teeth are lophodont?
(a) Incisor and canine (b) Premolar and molar
(c) Canine and premolar (d) Premolar and incisor

6. Oxyntic cells are located in
(a) Islets of Langerhans
(b) Gastric epithelium and secrete pepsin
(c) Kidneys and secrete renin
(d) Gastric epithelium and secrete HCl

7. Continued consumption of a diet rich in butter, red meat and eggs for a long period may lead to
(a) vitamin A toxicity
(b) kidney stones
(c) hypercholesterolemia
(d) urine laden with ketone bodies

8. Which one of the following is a matching pair of a substrate and its particular digestive enzyme?
(a) Starch — maltase (b) Lactose — rennin
(c) Maltose — steapsin (d) Casein — chymotrypsin

RESPONSE GRID					
1. (a)(b)(c)(d)	**2.** (a)(b)(c)(d)	**3.** (a)(b)(c)(d)	**4.** (a)(b)(c)(d)	**5.** (a)(b)(c)(d)
6. (a)(b)(c)(d)	**7.** (a)(b)(c)(d)	**8.** (a)(b)(c)(d)		

Space for Rough Work

9. Which one of the following is a matching pair of a vitamin and the deficiency disease related with it ?
(a) Riboflavin — beri beri
(b) Thiamine — xerophthalmia
(c) Niacin — pellagra
(d) Calciferol — scurvy

10. Which one of the following pairs of the cells with their secretion is **correctly** matched?
(a) Oxyntic cells - A secretion with pH between 2.0 and 3.0.
(b) Alpha cells of Islets of Langerhans -Secretion that decreases blood sugar level.
(c) Kupffer cells - A digestive enzyme that hydrolysis nucleic acids.
(d) Sebaceous glands - A digestive enzyme that hydrolysis nucleic acids

11. "Kwashiorkar' and 'Beri-Beri' are
(a) communicable diseases
(b) infectious diseases
(c) deficiency diseases
(d) None of the above

12. First milk produced after child birth is called
(a) sebum (b) cerumen
(c) true milk (d) colostrum

13. Cirrhosis of liver is caused by the chronic intake of
(a) Opium
(b) Alcohol
(c) Tobacco (Chewing)
(d) Cocaine

14. The sphincter of Oddi is present between
(a) Oesophagus and cardiac stomach
(b) Pyloric stomach and duodenum
(c) Hepatic duct and cystic duct
(d) Hepatopancreatic duct and duodenum

15. The structure which prevents the entry of food into the windpipe is
(a) Gullet (b) Glottis
(c) Tonsil (d) Epiglottis

16. Layer of cells that secrete enamel of tooth is
(a) Osteoblast (b) Ameloblast
(c) Odontoblast (d) Dentoblast

17. Cow's milk is slightly yellowish in colour due to the presence of
(a) Carotene
(b) Riboflavin
(c) Xanthophyll
(d) Xanthophyll and Carotene

18. Accessory excretory organs of man are
(a) only skin
(b) only skin and liver
(c) only skin and lungs
(d) skin, lungs, liver and intestine

19. Cholecystokinin is secretion of
(a) Duodenum that causes contraction of gall bladder
(b) Globlet cells of ileum, stimulates secretion of succus entericus
(c) Liver and controls secondary sex characters
(d) Stomach that stimulates pancreas to release juice

20. Which of the following sets represents vestigial organs?
(a) Vermiform appendix, body hair and patella
(b) Wisdom teeth, body hair and atlas vertebra
(c) Ear muscles, cochlea and coccyx
(d) Vermiform appendix, ear muscles and coccyx.

21. Which part of the alimentary canal does not secrete any enzyme?
(a) Mouth (b) Oesophagus
(c) Stomach (d) Duodenum

22. The protein coated, water soluble fat globules are called
(a) Chylomicrons (b) Micelles
(c) Chyle (d) Monoglycerides

23. Where do certain symbiotic micro-organisms normally occur in human body?
(a) Caecum
(b) Oral lining and tongue surface
(c) Vermiform appendix and rectum
(d) Duodenum

RESPONSE GRID

9. ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ
14. ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ
19. ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ

Space for Rough Work

24. Both the crown and root of a tooth is covered by a layer of bony hard substance. It is called
(a) enamel (b) dentine
(c) bony socket (d) cementum

25. Which one of the following pairs of the kind of cells and their secretion is correctly matched?
(a) Oxyntic cells—a secretion with pH between 2.0 and 3.0
(b) Alpha cells of islets of Langerhans—secretion that decreases blood sugar level
(c) Kupffer cell—a digestive enzyme that hydrolyses nucleic acids
(d) Sebaceous glands—a secretion that evaporates for cooling

26. Which one of the following is the correct matching of the site of action on the given substate, the enzyme acting upon it and the end product?
(a) Small intestine : Proteins $\xrightarrow{\text{Pepsin}}$ Amino acids
(b) Stomach : Fats $\xrightarrow{\text{Lipase}}$ Micelles
(c) Duodenum : Triglycerides $\xrightarrow{\text{Trypsin}}$ Monoglycerides
(d) Small intestine : Starch $\xrightarrow{\alpha-\text{Amylase}}$ Disaccharide (maltose)

27. Read the following four statements (i) - (iv) with certain mistakes in two of them.
(i) Fructose is generally absorbed by simple diffusion.
(ii) The digestive wastes, solidified into coherent faeces in the rectum initiate and endocrinal action causing an urge or desire for its removal
(iii) The food mixes thoroughly with the acidic gastric juice of the stomach by the churning movements of its muscular wall and is called the chyme.
(iv) The secretions of the brush border cells of the mucosa alongwith the secretions of the goblet cells constitute the succus entericus.

28. Which of the following dietary deficiencies will affect the functioning of enzymes in the human body most quickly?
(a) Too few carbohydrates
(b) Shortage of fat-soluble vitamins
(c) Shortage of water-soluble vitamins
(d) Insufficient variety of fats

29. Pancreatic cancer is an especially dangerous disease in people because the pancreas is
(a) the organ that produces and stores bile.
(b) the site of synthesis for all of the essential amino acids.
(c) one of the organs through which food must pass on its way to the colon.
(d) an organ in which many different kinds of digestive enzymes are manufacture

30. How does a gastrovascular cavity differ from an alimentary canal? The gastrovascular cavity
(a) stores food but does not digest it.
(b) is usually much larger.
(c) has only one opening.
(d) functions in digestion but not absorption.

31. The largest variety of digestive enzymes function in the
(a) large intestine. (b) oral cavity.
(c) stomach. (d) small intestine.

32. Certain amino acids are essential to the diet of animals because
(a) they prevent overnourishment
(b) they are cofactors and coenzymes that are required for normal physiological function.
(c) an animal cannot directly synthesize them through the transfer of an amino group to an appropriate carbon skeleton.
(d) animals need these substances in order to make the stored fats that are used during hibernation and migration

RESPONSE GRID					
	24. ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ
	29. ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	

Space for Rough Work

33. Protection of the walls of the stomach against the action of its own digestive juices
(a) results from the presence of an anti-enzyme chemical formed by the gastric glands
(b) results from the nervous reactions of the lining of the stomach.
(c) is controlled by a centre in the medulla of the brain.
(d) results from the neutralizing, buffering, and a coating mucus covering its inner surface

34. Most of the chemical digestion of food in humans is completed in the
(a) small intestine. (b) appendix.
(c) ascending colon (d) stomach

35. Which of the following is characteristic of the large intestine?
(a) It has almost no bacterial populations.
(b) It contains chyme.
(c) It absorbs much of the water remaining in waste materials.
(d) It is the site of most of digestion.

36. The innermost layer of the digestive tract is the
(a) serosa membrane.
(b) mucosa membrane.
(c) submucosa membrane.
(d) lumen.

37. The _____ is primarily a storage chamber within the digestive system, while the _____ reabsorbs water, ions, and generates the faeces.
(a) buccal cavity; midgut
(b) crop; midgut
(c) stomach; hindgut
(d) buccal cavity; hindgut

38. What does an increase in the secretion of insulin produce?
(a) a decrease in glucose metabolism
(b) a decrease in glucose permeability of cells
(c) an increase in blood sugar level
(d) an increase in glucose permeability of cells

39. Which function of the liver results in the production of bile pigments?
(a) breakdown of haemoglobin
(b) deamination of amino acids
(c) detoxification of metabolic poisons
(d) release of stored vitamin A

40. The centre of hunger or centre which regulates the amount of food we eat or out appetite is located in –
(a) Medulla (b) Cerebrum
(c) Hypothalamus (d) Alimentary canal

41. Fatty acid and glycerol are first taken up from alimentary canal by
(a) Villi (b) Blood capillaries
(c) Hepatic portal vein (d) Lymph vessels

42. Mammals may drink water and also get it from
(a) Breakdown of glycogen into glucose
(b) Secretion of saliva
(c) Oxidation of glucose
(d) Conversion of oxyhaemoglobin into haemoglobin

43. When a piece of bread in chewed it tastes sweet because
(a) The sugar contents are drawn out
(b) Saliva converts starch into maltose
(c) It does not taste sweet
(d) The taste buds are stimulated by chewing

44. Anxiety and eating spicy food together in an otherwise normal human, may lead to
(a) Indigestion (b) Jaundice
(c) Diarrhoea (d) Vomiting

45. A young infant may be feeding entirely on mothers milk which is white in colour but the stools which the infant passes out is quite yellowish. What is this yellow colour due to ?
(a) bile pigments passed through bile juice
(b) undigested milk protein casein
(c) pancreatic juice poured into duodenum
(d) intestinal juice

RESPONSE GRID					
	33. ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ
	38. ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ
	43. ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ		

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 16 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB17

SYLLABUS : Breathing and Exchange of Gases

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Bulk of carbon dioxide (CO_2) released from body tissues into the blood is present as
(a) bicarbonate in blood plasma and RBCs
(b) free CO_2 in blood plasma
(c) 70% carbamino- haemoglobin and 30% as bicarbonate
(d) carbamino-haemoglobin in RBCs

2. A large proportion of oxygen is left unused in the human blood even after its uptake by the body tissues. This O_2
(a) acts as a reserve during muscular exercise
(b) raise the pCO_2 of blood to 75 mm of Hg.
(c) is enough to keep oxyhaemoglobin saturation at 96%
(d) helps in releasing more O_2 to the epithelial tissues.

3. Oxygen dissociation curve of haemoglobin is
(a) Sigmoid (b) Hyperbolic
(c) Linear (d) Hypobolic

4. Which one of the following organs in the human body is most affected due to shortage of oxygen?
(a) Intestine (b) Skin (c) Kidney (d) Brain

5. When CO_2 concentration in blood increases, breathing becomes
(a) shallower and slow
(b) there is no effect on breathing
(c) slow and deep
(d) faster and deeper

6. Although much CO_2 is carried in blood, yet blood does not become acidic, because
(a) it is absorbed by the leucocytes
(b) blood buffers play an important role in CO_2 transport.
(c) it combines with water to form carbonic acid (H_2CO_3) which is neutralized by Na_2CO_3.
(d) it is continuously diffused through tissues and is not allowed to accumulate.

7. Which one of the following is the correct statement for respiration in humans?
(a) Workers in grinding and stone-breaking industries may suffer from lung fibrosis.
(b) About 90% of carbon dioxide (CO_2) is carried by haemoglobin as carbaminohaemoglobin.
(c) Cigarette smoking may lead to inflammation of bronchi.
(d) Neural signals from pneumotoxic centre in pons region of brain can increase the duration of inspiration.

8. The largest quantity of air that can be expired after a maximal inspiratory effort is called
(a) residual volume (b) tidal volume
(c) vital capacity (d) total lung volume

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ		

Space for Rough Work

9. Which one of the following statements is incorrect ?
(a) The presence of non-respiratory air sacs, increases the efficiency of respiration in birds.
(b) In insects, circulating body fluids serve to distribute oxygen to tissues.
(c) The principle of countercurrent flow facilitates efficient respiration in gills of fishes.
(d) The residual air in lungs slightly decreases the efficiency of respiration in mammals.

10. During oxygen transport the oxyhaemoglobin at the tissue level liberates oxygen to the cells because in tissue
(a) O_2 concentration is high and CO_2 is low
(b) O_2 concentration is low and CO_2 is high
(c) O_2 tension is high and CO_2 tension is low
(d) O_2 tension is low and CO_2 tension is high

11. Emphysema developes mainly because of
(a) Allergy or hypersensitisation
(b) Spasm of the smooth muscles of bronchioles
(c) Cigarette smoking
(d) Inflammation of the alveoli

12. During inspiration the diaphragm
(a) relaxes to become dome-shaped
(b) contracts and flattens
(c) expands
(d) shows no change

13. The volume of air breathed in and out during normal breathing is called
(a) Vital capacity
(b) Inspiratory reserve volume
(c) Explratory reserve volume
(d) Tidal volume

14. What would happen if human blood becomes acidic (low pH)
(a) Oxygen carying capacity of haemoglobin increases
(b) Oxygen carrying capacity of haemoglobin decreases
(c) RBCs count increases
(d) RBCs count decreases

15. The respiratory centre, which regulates respiration, is located in
(a) Cerebral peduncle (b) Vagus nerve
(c) Pons (d) Medulla oblongata

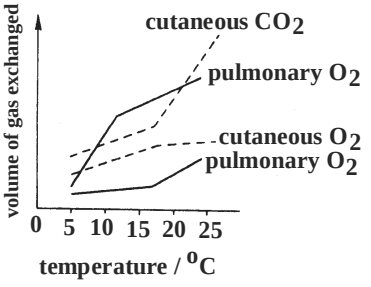
16. Even when there is no air in it, human trachea does not collapse due to presence of
(a) Bony rings (b) Turgid pressure
(c) Chitinous rings (d) Cartilaginous rings

17. The structure which does not contribute to the breathing movements in mammals is
(a) Larynx (b) Ribs
(c) Diaphragm (d) Intercostal muscles

18. In emphysema –
(a) Gas exchange area of lungs is reduced
(b) Gas exchange area of lungs is increased
(c) Trachea gets narrowed
(d) Larynx is permanently closed

19. Which of the following changes occur in diaphragm and intercostal muscles when expiration of air takes place?
(a) External intercostal muscles relax and diaphargm contracts
(b) External intercostal muscles contract and diaphargm relaxes
(c) External intercostal muscles and diaphargm relax
(d) External intercostal muscles and diaphargm contract

20. The graph below shows how gaseous exchange in an amphibian varies with temperature.



The graph shows that at all temperatures the lungs :
(a) absorb more oxygen than the skin
(b) absorb less oxygen than the skin
(c) release more carbon dioxide than the skin
(d) release less carbon dioxide than the skin

21. Which statement explains the significance of myoglobin in muscle tissue?
(a) Myoglobin can associate with oxygen in conditions of high carbon dioxide tension
(b) Myoglobin can dissociate from oxygen most readily under aerobic conditions
(c) Myoglobin acts as an oxygen store delaying the onset of anaerobic respiration
(d) Myoglobin acts as a buffer to hydrogen ions produced during anaerobic respiration

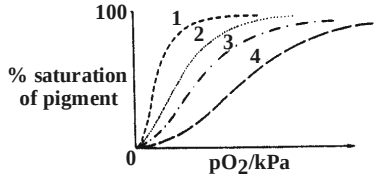
22. When you exhale, the diaphragm
(a) relaxes and arches.
(b) relaxes and flattens.
(c) contracts and arches.
(d) contracts and flattens.

23. Smoking destroys the cilia in the respiratory passageways. This
(a) makes it harder to move air in and out of the lungs.
(b) decreases the surface area for respiration.
(c) slows blood flow through lung blood vessels.
(d) makes it harder to keep the lungs clean.

RESPONSE GRID					
	9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
	14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
	19. (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)	**22.** (a)(b)(c)(d)	**23.** (a)(b)(c)(d)

Space for Rough Work

24. The graph shows dissociation curves for four respiratory pigments.



Which combination identifies the four curve?

	adult haemoglobin with high CO_2	adult haemoglobin	myo-globin	foetal haemoglobin
(a)	1	2	3	4
(b)	2	1	4	3
(c)	3	2	1	4
(d)	3	4	2	1

25. Gas flows into the lungs of mammals during inspiration because
(a) The pressure in the lungs falls below atmospheric pressure.
(b) The volume of the lungs decreases.
(c) The pressure in the lungs rises above atmospheric pressure.
(d) The diaphragm moves upward toward the lungs.

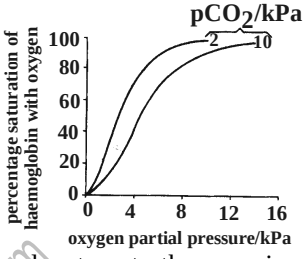
26. The Bohr shift describes
(a) The outward movement of Cl^- from the blood cell in exchange for HCO_3^- moving into the cell.
(b) The leftward shift of the entire oxygen equilibrium curve when temperature rises.
(c) The rightward shift of the entire oxygen equilibrium curve when pH rises.
(d) The rightward shift of the entire oxygen equilibrium curve when pH falls.

27. The movement of O_2 and CO_2 between the blood in the tissue capillaries and the cells in tissues depends most directly upon
(a) active transport of O_2 and CO_2.
(b) total atmospheric (barometric) pressure differences across the cell membranes.
(c) diffusion of O_2 and CO_2 down a concentration gradient.
(d) diffusion of O_2 and CO_2 down a partial pressure gradient.

28. The function of the mucus elevator in the mammalian respiratory system is to
(a) move surfactant from the bronchi to the alveoli.
(b) produce negative pressure during inhalation.
(c) stimulate contraction of rib musculature during forcible exhalation.
(d) trap and remove particulate matter that has entered the respiratory system.

29. The oxygen-binding curve for myoglobin is steep and shifted to the left of the same curve for hemoglobin. This indicates that
(a) people with myoglobin are acclimated for life at high altitudes.
(b) myoglobin occurs in high concentration in the human foetus.
(c) myoglobin does not function well at high percent saturation of oxygen.
(d) myoglobin picks up and releases O_2 at lower Po_2 values than does haemoglobin.

30. The graph shows haemoglobin-oxygen dissociation curves at two different partial pressures of carbon dioxide



What is the advantage to the organism of the difference between the curve?
(a) CO_2 is readily released into the alveoli
(b) Haemoglobin removes more CO_2 from active tissues
(c) Haemoglobin can release oxygen to myoglobin
(d) Oxygen is readily released into active tissues

31. A person can hold his breath longer if he gradually exhales than if he keeps his lungs fully expanded. This phenomenon is due to the fact that :
(a) concentration of CO_2 in the blood decreases, lessening the excitatory input to the carotid bodies
(b) he is then using less O_2 as his thoracic muscles are not working as hard
(c) stretch receptors in his lungs are then not firing as much thus lessening the excitatory input to the expiratory centres
(d) he is preventing the pressure in his lungs from increasing too much

32. The alveoli contain specialized cells that secrete a phospholipoprotein complex known as pulmonary surfactant. The function of pulmonary surfactant is :
(a) to provide some rigidity to the alveoli to prevent lung collapse
(b) to decrease the surface tension of the alveoli, making it easier to expand them
(c) to facilitate the diffusion of O_2 and CO_2 by providing protein channels through which these gases flow
(d) to provide a sticky surface upon which dust and microbes are trapped and disposed of.

RESPONSE GRID					
	24. ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ
	29. ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	

Space for Rough Work

33. During inspiration, the air is brought into the lungs by the working of the thoracoabdominal pump whereby the :
(a) diaphragm contracts to lengthen the thoracic cavity
(b) chest muscles pull the ribs up and out to widen the thoracic cavity
(c) abdominal muscles relax
(d) all of the above

34. The binding of an O_2 atom to the first iron atom of a haemoglobin molecule
(a) occurs at a very low partial pressure of oxygen
(b) produces a conformational change that lowers the other subunits' affinity for oxygen
(c) is an example of cooperativity as O_2 readily binds to the other subunits.
(d) occurs more readily at a lower pH value.

35. What is the function of the cilia in the trachea and bronchi?
(a) movement of air into and out of the lungs
(b) increase the surface area for gas exchange
(c) filter the air that rushes through them
(d) sweep mucus with its trapped particles up and out of the respiratory tract

36. A shift in the O_2 binding capacity of hemoglobin as a function of pH is known as
(a) oxygen binding
(b) the Hering-Breuer reflex
(c) the Bohr effect.
(d) respiratory ventilation

37. The most important function of diaphragm is
(a) To divide body cavity into compartments
(b) To protect lungs
(c) To aid in digestion
(d) To aid in ventilation

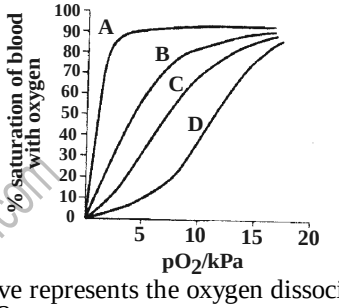
38. Which is not a structure of the respiratory system ?
(a) the pharynx (b) the bronchus
(c) the larynx (d) the hyoid

39. The alveoli of the lungs do not contain "air" because
(a) we normally do not ventilate our lungs at a high enough rate.
(b) the lungs have too many alveoli to ventilate.
(c) there is "dead space" in the trachea and bronchi.
(d) the trachea and bronchi are too small in volume.

40. Which of the following is not a reason that breathing air is easier than breathing water?
(a) A given volume of air is easier to move across the respiratory organs than the same volume of water.
(b) Air holds more oxygen per unit volume than water.
(c) Water breathers have a difficult time ridding themselves of CO_2 because CO_2 does not dissolve well in water.
(d) Temperature increases affect the O_2 content of water more than they do that of air.

41. Which of the following represents a larger volume of air than is normally found in the resting tidal volume of a human lung ?
(a) Residual volume
(b) Inspiratory reserve volume
(c) Expiratory reserve volume
(d) All of the above

42. The graph shows four dissociation curves.



Which curve represents the oxygen dissociation curve for myoglobin?
(a) At A (b) At B (c) At C (d) At D

43. Functional residual capacity can be represented as
(a) TV + ERV (b) ERV + RV
(c) RV + IRV (d) ERV + TV + IRV

44. The process of migration of chloride ions from plasma to RBC and carbonate ions from RBC to plasma is
(a) chloride shift (b) ionic shift
(c) atomic shift (d) Na^+ pump

45. The quantity 1500 ml in the respiratory volumes of a normal human adult refers to
(a) maximum air that can be breathed in and breathed out
(b) residual volume
(c) expiratory reserve volume
(d) total lung capacity

RESPONSE GRID					
	33. ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ
	38. ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ
	43. ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ		

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 17 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	50	Qualifying Score	65
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB18

SYLLABUS : Body Fluids and Circulation

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Blood pressure is measured by
(a) sphygmomanometer (b) stethoscope
(c) electrocardiogram (d) phonocardiogram

2. Coronary artery disease (CAD) is often referred to as
(a) Heart failure (b) Cardiac arrest
(c) Atherosclerosis (d) Thrombosis

3. Which one of the following is a **correct** matching pair?
(a) Lubb - Sharp closure of AV valves at the beginning of ventricular systole.
(b) Dup - Sudden opening of semilunar valves at the beginning of ventricular diastole.
(c) Pulsation of the radial artery valves in the blood vessels.
(d) Purkinje fibers - Initiation of the heart beat.

4. Child death may occur in the marriage between
(a) Rh^+ man and Rh^+ woman
(b) Rh^+ man and Rh^- woman
(c) Rh^- man and Rh^- woman
(d) Rh^- man and Rh^+ woman

5. Heart is covered by
(a) Peritoneum (b) Pleural membrane
(c) Pericardium (d) Visceral membrane

6. Which one of the components of ECG in human is correctly interpreted below ?
(a) Complex QRS-One complete Pulse
(b) Peak T - Initiation of total cardiac contraction
(c) Peak P and Peak R together-Systolic and diastolic blood pressures
(d) Peak P- Initiation of left atrial contraction only

7. Pacemaker of heart is
(a) AV node (b) Bundle of His
(c) SA node (d) Purkinje fibres

8. Uricotelism is found in
(a) Frogs and toads
(b) Mammals and birds
(c) Birds, reptiles and insects
(d) Fishes and fresh water protozoans

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ		

Space for Rough Work

9. Haemoglobin is having maximum affinity with:
(a) NH_3 (b) O_2
(c) CO_2 (d) CO

10. An adult human with average health has systolic and diastolic pressures as
(a) 80mm Hg and 80 mm Hg
(b) 70 mm Hg and 120 mm Hg
(c) 120 mm Hg and 80 mm Hg
(d) 50 mm Hg and 80 mm Hg

11. Blood group AB has
(a) no antigen
(b) no antibody
(c) neither antigen nor antibody
(d) both antigen and antibody

12. With reference to the blood in a normal person, which one of the following statements is correct?
(a) Compared to arteries, veins are less numerous and hold less of the body's blood at any given time.
(b) Blood cells constitute about 70 percent of the total volume of the blood.
(c) White blood cells (WBC) are made by lymph nodes only.
(d) The blood has more platelets than WBC.

13. Thickening of arteries due to cholesterol deposition is
(a) arteriosclerosis (b) rheumatic heart
(c) blood pressure (d) cardiac arrest

14. Hepatic portal system carries
(a) Oxygenated blood from liver to intestine
(b) Deoxygenated blood from liver to intestine
(c) Oxygenated blood from intestine to liver
(d) Deoxygenated blood from intestine to liver

15. 'Bundle of His' is a part of which one of the following organs in humans?
(a) Brain (b) Heart
(c) Kidney (d) Pancreas

16. Chordae tendinae are found in
(a) joints of legs (b) atria of heart
(c) ventricles of brain (d) ventricles of heart

17. The pattern of contraction and relaxation of the heart is referred to as
(a) blood pressure (b) arterial flow
(c) blood flow (d) cardiac cycle

18. Which of the following statements are true ?
(i) The blood transports CO_2 comparatively easily because of its higher solubility.
(ii) Approximately 8-9% of CO_2 is transported being dissolved in the plasma of blood.
(iii) The carbon dioxide produced by the tissues, diffuses passively into the blood stream and passes into red blood corpuscles and react with water to form H_2CO_3.
(iv) The oxyhaemoglobin (HbO_2) of the erythrocytes is basic.
(v) The chloride ions diffuse from plasma into the erythrocytes to maintain ionic balance.
(a) (i), (iii) and (v) are true, (ii) and (iv) are false
(b) (i), (iii) and (v) are false, (ii) and (iv) are true
(c) (i), (ii) and (iv) are true, (iii) and (v) are false
(d) (i), (ii) and (iv) are false, (iii) and (v) are true

19. About 70% of CO_2 is transported as
(a) Carbonic acid (b) Carboxyhaemoglobin
(c) Bicarbonates (d) Carbamino compounds

20. In human heart, which of the following valve remains in contact of the oxygenated blood only?
(a) Tricuspid valve (b) Semi lunar valve
(c) Eustachian valve (d) Mitral valve

21. Myocardial Infarction is caused by
(a) hardening of arteries
(b) lumpy thickness develop in the inner walls of arteries
(c) clot may occur in the lumen of a coronary artery
(d) sudden interruption in blood flow towards a portion of heart

22. The affinity of CO with Hb is more than oxygen by
(a) 2 times (b) 20 times
(c) 200 times (d) 2000 times

23. Life span of human RBCs is
(a) 120 days (b) 20 days
(c) 9 days (d) 90 days

RESPONSE GRID					
	9. ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ
	14. ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ
	19. ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ

Space for Rough Work

24. Which one of the following is a incorrect matching pair?
(a) Lubb-Sharp closure of AV valves at the beginning of atrial systole
(b) Dub-Sudden opening of semilunar valves at the end of ventricular systole
(c) Cardiac Output-Stroke volume and heart beat
(d) Initiation of the heart beat -sino atrial node

25. Erythroblastosis foetalis occurs when
(a) Mother is Rh negative and father is Rh positive
(b) Father is Rh negative and mother is Rh positive
(c) Both are Rh positive
(d) Both are Rh negative

26. Which of the following set of animals has an incomplete double circulation system?
(a) Frog and crocodile (b) Shark and whale
(c) Lizard and pigeon (d) Toad and lizard

27. Find out the incorrect answer from the following?
(a) Veins are typically larger in diameter than arteries
(b) Because of their small size, capillaries contain blood that is moving more quickly than in other parts of the circulatory system
(c) The walls of arteries are elastic, enabling them to stretch and shrink during changes in blood pressure
(d) Veins contain more blood than any other part of the circulatory system

28. Given below are four statements (i-iv) regarding human blood circulatory system
(i) Arteries are thick-walled and have narrow lumen as compared to veins
(ii) Angina is acute chest pain when the blood circulation to the brain is reduced
(iii) Persons with blood group AB can donate blood to any person with any blood group under ABO system
(iv) Calcium ions play a very important role in blood clotting
Which two of the above statements are correct?
(a) (i) and (iv) (b) (i) and (iv)
(c) (ii) and (iii) (d) (iii) and (iv)

29. Haldane effect plays more important role in promoting carbon dioxide transport than that of the Bohr's effect in promoting oxygen transport because
(a) oxyhaemoglobin is a stronger acid which donates hydrogen ion (H^+) which in turn displace carbon dioxide from blood
(b) carbaminohaemoglobin is a stronger acid which splits into hydrogen ion (H^+) and bicarbonate (HCO_3^-)
(c) carbon dioxide reacts with water to form carbonic acid that lowers the pH in tissue
(d) carbon dioxide is less soluble in venous blood than in arterial blood

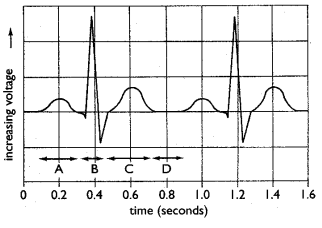
30. Which of the following factors is known as Christmas factor?
(a) Factor VIII (b) Factor XII
(c) Factor IV (d) Factor IX

31. In veins, values are present to check backward flow to blood flowing at
(a) high pressure (b) atmospheric pressure
(c) low pressure (d) all of these

32. In a cardiac output of 5250 ml per minute, with 75 heartbeats per minute, the stroke volume is
(a) 60 ml (b) 80 ml
(c) 55 ml (d) 70 ml

33. Heart valves function to
(a) keep blood moving forward through the heart.
(b) mix blood thoroughly as it passes through the heart.
(c) control the amount of blood pumped by the heart.
(d) slow blood down as it passes through the heart.

34. The accompanying diagram shows a small part of a normal electrocardiogram. Which region represents a wave of excitation passing through the ventricles?



(a) A (b) B
(c) C (d) D

RESPONSE GRID					
	24. ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ
	29. ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ
	34. ⓐⓑⓒⓓ				

Space for Rough Work

35. Just after blood leaves the left ventricle of the human heart, it passes through the
(a) pulmonary artery (b) left atrium
(c) aorta (d) superior vena cava

36. In the human body, the highest blood pressure can be recorded in
(a) arteries near the heart
(b) veins returning to the heart
(c) capillaries of the body tissue
(d) the lungs

37. Blood flows rather rapidly as it leaves the human heart. Upon arriving at the capillaries, it slows dramatically. This reduction in speed is due largely to
(a) the loss of pressure as the blood gets farther away from the heart.
(b) changes in pressure that result from water evaporation on the skin.
(c) the resistance offered by the small diameter of the capillaries.
(d) differences in pressure caused by the sugar content of the blood.

38. The atrial walls are ___ than the ventricular wall, and pressure generated in the atrial chambers is ___ than in the ventricles.
(a) thinner, higher (b) thinner, lower
(c) thicker, higher (d) thicker, lower

39. Atheroma consist mainly of
(a) cholesterol and lipid hardened by calcium
(b) cholesterol and lipid hardened by iron
(c) glycogen and protein hardened by calcium
(d) glycogen and protein hardened by iron

40. The left ventricle exceeds the right ventricle in
(a) the amount of blood that enters during heart contraction.
(b) the volume expelled during contraction
(c) the pressure developed during contraction
(d) all of the above

41. The purpose of the AV node is to ___ and the purpose of the Purkinje fibers is to___ .
(a) create simultaneous atrial and ventricular depolarization; speed up transmission of the cardiac impulse into the ventricle
(b) delay ventricular depolarization relative to atrial depolarization; insulate the cardiac impulse from the general ventricular fibers
(c) delay ventricular depolarization relative to atrial depolarization; transmit the cardiac impulse to very small localized groups of ventricular fibers
(d) delay atrial depolarization relative to ventricular depolarization; transmit the cardiac impulse to very small localized groups of ventricular fibers

42. Persons suffering from high blood pressure should take the following precaution to avoid excessive rise in their blood pressure
(a) sleep as much as possible
(b) avoid standing
(c) increase their weight
(d) avoid emotional disturbances and excitement

43. You are required to draw blood from a patient and to keep the blood in a test tube for analysis of corpuscles and plasma. You are also provided with the following four types of test tubes. Which of them will you not use for the purpose?
(a) Test tube containing calcium bicarbonate
(b) Chilled test-tube
(c) Test-tube containing heparin
(d) Test-tube containing sodium oxalate

44. A drop of each of the following, is placed separately on four slides. Which of them will not coagulate?
(a) Blood serum
(b) Sample from the thoracic duct of lymphatic system
(c) Whole blood from pulmonary vein
(d) Blood plasma

45. Examination of blood of a person suspected of having anemia, shows large, immature, nucleated erythrocytes without haemoglobin. Supplementing his diet with which of the following, is likely to alleviate his symptoms?
(a) Folic acid and cobalamine (b) Riboflavin
(c) Iron compounds (d) Thiamine

RESPONSE GRID					
	35. ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ
	40. ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ
	45. ⓐⓑⓒⓓ				

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 18 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	50	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB19

SYLLABUS : Excretory Products and Their Elimination

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Toxic substances are detoxified in human body in
(a) kidney (b) lungs (c) liver (d) stomach

2. The function of rennin is
(a) vasodilation
(b) reduce blood pressure
(c) degradation of angiotensinogen
(d) None of the above

3. Proximal and distal convoluted tubules are parts of
(a) Seminiferous tubules (b) Nephron
(c) Oviduct (d) Vas deferens

4. Antidiuretic hormone
(a) Secretion is determined by plasma osmolarity
(b) Increases permeability of renal collecting duct cells to water
(c) Is secreted by nerve cells with their cell bodies in hypothalamus
(d) All the above

5. Which one of the following is correctly matched pair of the given secretion and its primary role in human physiology?
(a) Sebum — Sexual attraction
(b) Sweat — Thermoregulation
(c) Saliva — Tasting food
(d) Tears — Excretion of salts

6. A person who is one along hunger strike and is surviving only on water, will have
(a) less amino acids in his urine
(b) more glucose in his blood
(c) less urea in his urine
(d) more sodium in his urine

7. Uricotelism is found in
(a) Frogs and toads
(b) Mammals and birds
(c) Birds, reptiles and insects
(d) Fishes and fresh water protozoans

8. If Henle's loop were absent from mammalian nephron which of the following is to be expected?
(a) The urine will be more concentrated
(b) The urine will be more dilute
(c) There will be no urine formation
(d) There will be hardly any change in the quality and quantity of urine formed

9. The basic functional unit of the human kidney is
(a) nephron (b) nephridia
(c) pyramid (d) Henle's loop

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	

Space for Rough Work

10. Reabsorption of water in distal parts of kidney tubules/urine formation is controlled by
(a) relaxin (b) calcitonin
(c) oxytocin (d) vasopressin

11. Urea from the blood can be removed by
(a) Uremia (b) Diuresis
(c) Dialysis (d) Micturition

12. In mammals, the urinary bladder opens into
(a) Uterus (b) Urethra
(c) Vestibule (d) Ureter

13. Which of the following components of blood does not enter into the nephron?
(a) urea (b) water
(c) glucose (d) plasma protein

14. Which one of the following correctly explains the function of a specific part of a human nephron ?
(a) Podocytes : create minute spaces (slite pores) for the filtration of blood into the Bowman's capsule.
(b) Henle's loop : most reabsorption of the major substances from the glomerular filtrate.
(c) Distal convoluted tubule : reabsorption of K^+ ions into the surrounding blood capillaries.
(d) Afferent arteriole : carries the blood away from the glomerular towards renal vein.

15. The condition of excess urea in blood is known as
(a) Polyuria (b) Haematuria
(c) Uraemia (d) Diuresis

16. Urine under normal conditions does not contain glucose because
(a) The normal blood sugar is fructose
(b) Glucose of blood is not filtered in the glomerulus
(c) Glucose in glomerular filtrate is reabsorbed in the uriniferous tubules
(d) Glucose in glomerular filtrate is converted into glycogen.

17. Which is not correct with respect to human kidney?
(a) The peripheral region is called cortex and central medulla
(b) Malpighian capsules are present in the cortex region
(c) Blood enters glomerulus through efferent arterioles
(d) The concave part of kidney is called hilus

18. Atrial natriuretic factor (ANF) is released in response to the increase in blood volume and blood pressure. Which of the following is not the function of ANF?
(a) Stimulates aldosterone secretion
(b) Inhibits the release of renin from JGA
(c) Stimulates salt loss in urine
(d) Inhibits sodium reabsorption from collecting duct

19. Reabsorption of chloride ions from glomerular filtrate in kidney tubule occurs by
(a) Active transport (b) Diffusion
(c) Osmosis (d) Brownian movement

20. Metanephric kidneys are found in
(a) Reptiles only (b) Birds only
(c) mammals only (d) All of these

21. In Prawn, excretion is carried out by
(a) Nephrons (b) Malpighian tubules
(c) Flame cells (d) Green glands

22. Consider the following four statements (i - iv) about certain desert animals such as kangaroo rat
(i) They have dark colour and high rate of reproduction and excrete solid urine
(ii) They do not drink water, breathe at a slow rate to conserve water and have their body covered with thick hairs
(iii) They feed on dry seeds and do not require drinking water
(iv) They excrete very concentrated urine and do not use water to regulate body temperature.
Which two of the above statements for such animals are true?
(a) (i) and (ii) (b) (iii) and (iv)
(c) (ii) and (iii) (d) (iii) and (i)

23. The longest loop of Henle is found in
(a) kangaroo rat (b) opposum
(c) rhesus monkey (d) porcupine

24. In peritoneal dialysis
(a) the blood is removed from the body and a natural filter is used
(b) the blood is not removed from the body and a natural filter is used
(c) the blood is not removed from the body and an artificial filter is used
(d) the blood is removed from the body and an artificial filter is used

25. Diabetes insipidus is a condition in which a person is unable to produce sufficient levels of the hormone ADH. The hormone increases the permeability to water of the second (distal) convoluted tubule and collecting duct in the kidney nephrons.
What is produced as a result?
(a) large volumes of concentrated urine
(b) large volumes of dilute urine
(c) small volumes of concentrated urine
(d) small volumes of dilute urine

RESPONSE GRID					
10. ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ
15. ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ
20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ
25. ⓐⓑⓒⓓ				

Space for Rough Work

26. By definition, an ectotherm
(a) is cold-blooded.
(b) is warm-blooded.
(c) obtains most of its heat from its environment.
(d) derives most of its heat from its own metabolism.

27. Which region of the kidney nephron is the main site of amino acid reabsorption?
(a) glomerulus
(b) Bowman's capsule
(c) proximal convoluted tubule
(d) distal convoluted tubule

28. Long term kidney failure can be treated by introducing sterile dialysis fluid into the abdominal cavity. The fluid is drained and replaced regularly using a tube inserted surgically through the abdominal wall.
Why does this method work well?
(a) because osmoregulation and excretion are achieved by diffusion between the blood in the abdominal capillaries and the dialysis fluid.
(b) because osmoregulation and excretion are achieved by the active transport of ions, water and urea between the abdominal capillaries and the dialysis fluid.
(c) because the fluid is in direct contact with the kidneys, the urea and excess ions can pass into it without being filtered by the glomeruli.
(d) because the fluid is in direct contact with the liver and the large intestine, and wastes and excess ions can pass into it from these organs.

29. Which of the following describes the route of urine out of the body after it leaves the kidney?
(a) renal vein-urinary bladder-urethra-ureter
(b) urethra-urinary bladder-ureter
(c) renal vein-ureter-urinary bladder-urethra
(d) ureter-urinary bladder-urethra

30. If the human kidneys filter 150 litres of plasma in a 24 hour period, what is the typical amount of urine produced and eliminated in that time period?
(a) 0.15 litres (b) 1.5 litres
(c) 15 litres (d) 30 litres

31. A number of hormones help to regulate water and solute uptake and release in the nephron. Antidiuretic hormone (ADH) promotes _____ in response to _____.
(a) active transport of Cl^-, increased solute concetration
(b) active transport of Na^+, increased blood pressure
(c) increased permeability of the collecting duct to water, increased blood pressure
(d) decreased permeability of the collecting duct to water, increased solute concetration

32. The filtrate formed by the nephrons in the kidney is not the same as urine. The filtrate is first refined and concentrated by the processes of _____, forming the urine that leaves the body.
(a) filtration and secretion
(b) reabsorption and secretion
(c) reabsorption and excretion
(d) filtration and reabsorption

33. What pathway is taken by water and solutes as they travel through a nephron?
(a) Glomerulus, to Bowman's capsule, to proximal tubule, to loop of Henle, to distal tubule, to collecting ducts
(b) Bowman's capsule, to glomerulus, to distal tubule, to loop of Henle, to proximal tubule, to collecting ducts
(c) Glomerulus, to Bowman's capsule, to distal tubule, to loop of Henle, to proximal tubule, to collecting ducts
(d) Glomerulus, to Bowman's capsule, to proximal tubule, to collecting ducts, to distal tubule, to loop of Henle

34. The kidney's filtration process is nonselective, so
(a) many valuable substances are lost in the urine.
(b) the proportions of substances in urine are the same as in blood.
(c) urine is much less concentrated than blood.
(d) useful substances must be selectively reabsorbed.

35. Na^+ and Cl^- are actively transported out of the tubules to help set up the countercurrent multiplier. Which the following are sites of active Na^+ and Cl^- transport in the nephron?
(a) Proximal tubule, ascending limb of the loop of Henle
(b) Descending limb of the loop of Henle, ascending limb of the loop of Henle
(c) Ascending limb of the loop of Henle, proximal tubule
(d) Collecting duct, descending limb of the loop of Henle

36. Which of the following is not a normal constituent of the glomerular filtrate?
(a) Red blood cells (b) Urea
(c) Sodium ion (d) Glucose

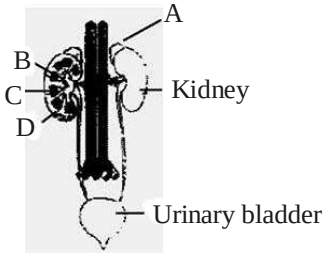
37. Kidneys help in the conservation of useful materials and excretion of wastes and therefore they receive 20% of the hearts output of blood (as much as the heart and brain combined). On a percentage basis which substance is most completely reabsorbed by the kidneys ?
(a) Water (b) Glucose
(c) Urea (d) Sodium

38. The sole mechanism for water reabsorption by the renal tubules is :
(a) active tansport
(b) osmosis.
(c) cotransport with sodium ions
(d) cotransport with bicarbonate ions

RESPONSE GRID					
	26. ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ
	31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ		

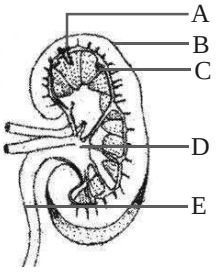
Space for Rough Work

39. Figure shown human urinary system with structures labelled A to D. Select option which correctly identifies them and gives their characteristics and /or functions.



(a) B-pelvis-broad funnel shaped space inner to hilum, directly connected to loops of Henle.
(b) C-Medulla-inner zone of kidney and contains complex nephrons.
(c) D - Cortex - outer part of kidney and do not contain any part of nephrons
(d) A-Adrenal gland - located at the anterior part of kidney. Secrete Catecholamines which stimulate glycogen breakdown.

40. Refer the following diagram and identify the parts of a kidney indicated



(a) A = cortex, B = nephron, C = pelvis, D= medulla, E = ureter
(b) A = cortex, B = medulla, C = nephron, D = pelvis, E = ureter
(c) A = nephron, B = cortex, C = medulla, D = ureter, E = pelvis
(d) A = nephron, B = cortex, C = medulla, D = pelvis, E = ureter

41. Select the option which shows correct matching of animal with excretory organs and excretory product

	Animal	**Excretory organs**	**Excretory product**
(a)	Housefly	Renal tubules	Uric acid
(b)	*Labeo* (Rohu)	Nephridial tubes	Ammonia
(c)	Salamander	Kidney	Urea
(d)	Peacock	Kidney	Urea

42. The appearance of albumin in the urine is most likely due to
(a) Increase in the blood pressure
(b) Decrease in the blood osmotic corpuscles
(c) Damage to the Malpighian corpuscles
(d) Damage to the proximal convoluted tubules

43. Kidney crystals are solid clusters of
(a) Calcium nitrate and uric acid
(b) Phosphate and uric acid
(c) Calcium carbonate and uric acid
(d) Calcium metabisulphite and uric acid

44. The liquid which is collected in the cavity of Bowman's capsule is
(a) Concentrated urine
(b) Blood plasma minus blood proteins
(c) Glycogen and water
(d) Sulphates and water

45. A person who is on a long hunger strike and is surviving only on water, will have –
(a) less amino acids in his urine
(b) more glucose in his blood
(c) less urea in his urine
(d) more sodium in his urine

RESPONSE GRID					
	39. ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ
	44. ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ			

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 19 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB20

SYLLABUS : Locomotion and Movement

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which ion is essential for muscle contraction?
(a) Na^+ (b) K^+
(c) Ca^{2+} (d) Cl^-

2. Elbow joint is an example of:
(a) hinge joint (b) gliding joint
(c) ball and socket joint (d) pivot joint

3. Two of the body parts which do not appear in MRI may be
(a) molar teeth and eye lens
(b) scapula and canines
(c) ligaments and ribs
(d) tendons and premolars

4. Which of the following is made up of a single bone in mammal ?
(a) Dentary (b) Hyoid
(c) Upper jaw (d) All of these

5. Intercoastal muscles are found attached with
(a) diaphragm (b) ribs
(c) pleura (d) lungs

6. Ball and socket joint is found between
(a) ribs and vertebral
(b) femur and tibio-fibula
(c) humerus and olecranon fossa
(d) humerus and pectoral girdle

7. Which of the following is the contractile protein of a muscle?
(a) Myosin (b) Tropomyosin
(c) Actin (d) Tubulin

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ			

Space for Rough Work

8. Myofibrils are made up of
(a) Myosin and actin
(b) Myosin and troponin
(c) Actin and tropomyosin
(d) All the above components

9. Which one of the following is the correct matching of three items and their grouping category?

	Items		Group
(a)	Ilium, ischium, pubis	-	coxal bones of pelvic girdle
(b)	Actin, myosin, rhodopsin.	-	muscle proteins
(c)	Cytosine, uracil, thiamine	-	pyrimidines
(d)	Malleus, incus, cochlea	-	ear ossicles

10. The number of floating ribs, in the human body, is
(a) 6 pairs (b) 5 pairs
(c) 3 pairs (d) 2 pairs

11. Select the **correct** statement regarding the specific disorder of muscular or skeletal system :
(a) *Myasthenia gravis* - Autoimmune disorder which inhibits sliding of myosin filaments.
(b) *Gout* - inflammation of joints due to extra deposition of calcium.
(c) *Muscular dystrophy* - age related shortening of muscles.
(d) *Osteoporosis* - decrease in bone mass and higher chances of fractures with advancing age.

12. The sensation of fatigue in the muscles after prolonged strenuous physical work, is caused by
(a) a decrease in the supply of oxygen
(b) minor wear and tear of muscle fibres
(c) the depletion of glucose
(d) the accumulation of lactic acid

13. Synovial fluid is found in
(a) cranial cavity (b) spinal cavity
(c) immovable joints (d) freely movable joints

14. Humerus differs from the femur in having:
(a) Sigmoid notch (b) Trochanter
(c) Deltoid ridge (d) None of these

15. The most abundant mineral in human body is
(a) Magnesium (b) Sodium
(c) Calcium (d) Potassium

16. Ankle joint is
(a) Pivot Joint (b) Ball and socket joint
(c) Hinge joint (d) Gliding joint

17. The major function of the intervertebral disc is to
(a) Absorb shock
(b) String the vertebrae together
(c) Prevent injuries
(d) Prevent hyperextension

18. Which one of the following pairs of chemical substances is correctly categorized?
(a) Calcitonin and thymosin - Thyroid hormones
(b) Pepsin and prolactin - Two digestive enzymes secreted in stomach
(c) Troponin and myosin - Complex proteins in striated muscles
(d) Secretin and rhodopsin - Polypeptide hormones

19. The functional unit of contractile system of a striated muscle is
(a) Sarcomere (b) Z-band
(c) Sarcosome (d) Myofibril

20. Joint between bones of human skull is
(a) Hinge joint (b) Synovial joint
(c) Cartilaginous joint (d) Fibrous joint

RESPONSE GRID

8. ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ
13. ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ
18. ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ		

Space for Rough Work

21. Which one of the following is the *correct description* of a certain part of the normal human skeleton ?
(a) Parietal bone and the temporal bone of the skull are joined by fibrous joint
(b) First vertebra is axis which articulates with the occipital condyles
(c) The 9th and 10th pairs of ribs are called the floating ribs
(d) Glenoid cavity is a depression to which the thigh bone articulates.

22. Which of the following is an autoimmune disorder ?
(a) Myasthenia gravis (b) Osteoporosis
(c) Muscular dystrophy (d) Gout

23. The joint in our neck which allows us to rotate our head left to right is
(a) pivot joint (b) hinge joint
(c) saddle joint (d) ellipsoid joint

24. Read the following statements carefully and select the correct ones.
(i) Cardiac fibres are branched with one or more nuclei
(ii) Smooth muscles are unbranched and cylindrical
(iii) Skeletal muscles can be branched or unbranched
(iv) Smooth muscles are non-striated
(a) only (iv) (b) (ii) and (iii)
(c) (iii) and (iv) (d) only (iii)

25. A cricket player is fast chasing a ball in the field. Which one of the following groups of bones is directly contributing in this movement?
(a) Femur, malleus, tibia, metatarsals
(b) Pelvis, ulna, patella, tarsals
(c) Sternum, femur, tibia, fibula
(d) Tarsals, femur, metatarsals, tibia

26. Which of the following statement is incorrect w.r.t. bone?
(a) If born is kept in HCl it becomes soft
(b) Bone is made up of 60&70% organic matter and 30&40% inorganic matter
(c) If bone is heated then the organic part disappears and inorganic part is retained
(d) Hydroxyapatite salts and fluorapatite salts are found in matrix

27. One of the following is a location of most abundant cartilage in the human body.
(a) Tracheal rings and costal cartilages
(b) Intevertebral disc and public symphysis
(c) Pinna and tip of nose
(d) Pectoral girdle and pelvic girdle

28. Upon preventing acetylcholine from diffusing across a neuromuscular junction, which of the following will *not* result?
(a) No action potential will be produced in the affected muscle fibre's plasma membrane.
(b) The endoplasmic reticulum releases calcium ions (Ca^{2+}) into the cytoplasm.
(c) Myosin will not bind to actin in the affected muscle fibre.
(d) The affected muscle fiber will fail to contract.

29. Muscle A and muscle B are the same size, but muscle A is capable of much finer control than muscle B. Which one of the following is likely to be true of muscle A?
(a) It contains fewer motor units than muscle B.
(b) It has larger sarcomeres than muscle B.
(c) It is controlled by more neurons than muscle B.
(d) It is controlled by fewer neurons than muscle B.

30. Much discussion of muscle is related to 'striated' muscle, but 'smooth' muscles are also important for
(a) protecting and nourishing striated muscle cells.
(b) conveying action potentials from nerve endings to the deepest parts of striated muscle.
(c) involuntary activities, such as movement of food in the gut and controlling blood pressure.
(d) sheathing the striated muscles so that they do not damage each other as they slide past one another.

RESPONSE GRID					
	21. (a)(b)(c)(d)	**22.** (a)(b)(c)(d)	**23.** (a)(b)(c)(d)	**24.** (a)(b)(c)(d)	**25.** (a)(b)(c)(d)
	26. (a)(b)(c)(d)	**27.** (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)	**30.** (a)(b)(c)(d)

Space for Rough Work

31. What is a hydrostatic skeleton largely composed of?
(a) Bone (b) Fluid
(c) Cartilage (d) Connective tissue

32 The only movable bone in the skull is:
(a) Mandible (b) Maxilla
(c) Ethmoid (d) None

33. The smallest irregular bone in man is:
(a) Patella (b) Stapes
(c) Nasal (d) Palatine

34. ATP provides the energy for muscle contraction by allowing for
(a) an action potential formation in the muscle cell.
(b) cross-bridge detachment of myosin from action.
(c) cross-bridge attachment of myosin to actin
(d) release of calcium by sarcoplasmic reticulum.

35. The primary difference between an endoskeleton and an exoskeleton has to do with
(a) the presence of both circular and longitudinal muscles.
(b) whether or not the skeleton is on the inside of the body.
(c) the presence or absence of joints.
(d) the amount of fluid in the body.

36. Deposition of uric acid crystals within the synovial joint causes:
(a) osteoarthritis (b) rheumatoid arthritis
(c) gout (d) paralysis

37. Total no. of muscles in our body is
(a) 256 muscles (b) 639 muscles
(c) 400 muscles (d) 421 muscles

38. The muscle band that remains unchanged during contraction and relaxation of the skeletal muscle is
(a) I (b) H
(c) A (d) Z line

39. What is not true about human skull ?
(a) It is dicondylic
(b) It includes 6 ear ossicles
(c) It includes 14 facial bones
(d) Hyoid is not included in skull bones

40. Which is part of pectoral girdle?
(a) Glenoid cavity (b) Sternum
(c) Ilium (d) Acetabulum

41. Number of bones in hind limb of human is-
(a) 21 (b) 24
(c) 30 (d) 14

42. Haversian system is diagnostic feature of-
(a) Avian bones (b) Reptilian bones
(c) Mammalian bones (d) Bones of all animal

43. In children the bones are more flexible and brittle because their bones have
(a) large quantity of salts and little organic substances
(b) large quantity of organic substances and little salts
(c) well developed haversian system
(d) large number of osteoblasts

44. Pneumatic bones are found in
(a) House lizard (b) Pigeon
(c) Flying fish (d) Frog's tadpole

45. Actin protein occurs in two forms
(a) Polymeric F- actin and monomeric G- actin
(b) Monomeric F- actin and polymeric G-actin
(c) The tail and a head
(d) F-actin and G- actin, but both globular

RESPONSE GRID					
	31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 20 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB21

SYLLABUS : Neural Control and Co-ordination

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Afferent nerve fibres carry impulses from
(a) effector organs to CNS (b) receptors to CNS
(c) CNS to receptors (d) CNS to muscles

2. The nerve centres which control the body temperature and the urge for eating are contained in:
(a) hypothalamus (b) pons
(c) cerebellum (d) thalamus

3. Rods and cones of eyes are modified
(a) multipolar neuron (b) unipolar neuron
(c) bipolar neuron (d) None of these

4. The nerve transmitter, produced at the synapse and neuromuscular junction, is
(a) GTP (b) ATP
(c) acetylcholine (d) phosphokinase

5. Alzheimer disease in humans is associated with the deficiency of:
(a) glutamic acid
(b) acetylcholine
(c) gamma aminobutyric acid (GABA)
(d) dopamine

6. Which is the example of conditioned reflex ?
(a) Eyes closed when anything enter into it.
(b) Hand took up when piercing with needle.
(c) Salivation in a hungry dog in response to ringing of a bell.
(d) Digestion food goes forward in alimentary canal.

7. The black pigment in the eye which reduces the internal reflection is located in
(a) retina (b) iris
(c) cornea (d) sclerotic

8. Which one of the following does not act as a neurotransmitter ?
(a) Epinephrine (b) Norepinephrine
(c) Cortisone (d) Acetylcholine

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ		

Space for Rough Work

9. During the propagation of a nerve impulse, the action potential results from the movement of :
(a) K^+ ions from extracellular fluid to intracellular fluid.
(b) Na^+ ions from intracellular fluid to extracellular fluid.
(c) K^+ ions from intracellular fluid to extracellular fluid.
(d) Na^+ ions from extracellular fluid to intracellular fluid.

10. The cochlea of ear contains
(a) perilymph
(b) aqueous humour
(c) perilymph and endolymph
(d) only endolymph

11. Eustachian tube connects
(a) External ear with middle ear
(b) External ear with internal ear
(c) Middle ear with pharynx
(d) Internal pharyax

12. Mark the incorrect statement
(a) The ear ossicle attached to tympanic membrane is malleus
(b) Opsin (of Rhodopsin) develops from vitamin A
(c) The pressure on ear drum is equalized by eustachian tube
(d) Otolith organ consists of saccule and utricle

13. Frequency of sound is discriminated by
(a) The intensity of movement of basilar fibres of cochlea
(b) The type of fluid - perilymph or endolymph
(c) The site at the cochlear coil
(d) All of these

14. Which one of the following is the correct difference between rod cells and cone cells of our retina?

		Rod Cells	Cone Cells
(a)	Distribution	More concentrated in centre of retina	Evenly distributed all over retina
(b)	Visual activity	High	Low
(c)	Visual pigment contained	Iodopsin	Rhodopsin
(d)	Over all function	Vision in poor light	Colour vision and detailed vision in bright light

15. Saltatory conduction of nerve impulse takes place through :
(a) Myelinated fibre
(b) Non-myelinated fibre
(c) Grey fibres
(d) None of these

16. In which part of the brain corpora quadrigemina is located?
(a) Diencephalon (b) Mesencephalon
(c) Prosencephalon (d) Rhombencephalon

17. A person entering an empty room suddenly finds a snake right in front on opening the door. Which one of the following is likely to happen in his neuro-hormonal control system ?
(a) Sympathetic nervous system is activated releasing epinephrine and norepinephrine from adrenal medulla.
(b) Neurotransmitters diffuse rapidly across the cleft and transmit a nerve impulse.
(c) Hypothalamus activates the parasympathetic division of brain.
(d) Sympathetic nervous system is activated releasing epinephrine and norepinephrine from adrenal cortex.

18. The blind spot is the region where
(a) Image is formed
(b) Cones are numerous
(c) The optic nerve leaves out
(d) Image is formed during the dark

19. In myopia or short sightedness
(a) Image is formed slightly in front of retina because eye ball is longer
(b) Eye ball is normal but image is formed over blind spot
(c) Eye ball is normal but images is formed slightly behind the retina due to faulty lens
(d) Curvature of cornea becomes irregular

20. Sequence of meninges from inner to outside is
(a) Duramater – Archnoid – Piamater
(b) Duramater – Piamater – Arachnoid
(c) Arachnoid – Duramater - Piamater
(d) Piamater- Arachnoid - Duramater

21. Among which one of the following groups of chemicals, all are neurotransmitters?
(a) Glycine, dopamine, melatonin
(b) Somatostatin, serotonin, acetylcholine
(c) Noradrenaline, somatostatin, threonine
(d) Acetylcholine, noradrenaline, dopamine

RESPONSE GRID

9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
19. (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)		

Space for Rough Work

22. The enzyme required for the conduction of nerve impulse across synapse is:
(a) peroxidase (b) choline acetylase
(c) ascorbic acid oxidase (d) succinic dehydrogenase

23. The purplish red pigment rhodopsin contained in the rods type of photoreceptor cells of the human eye, is a derivative of
(a) Vitamin A (b) Vitamin B_1
(c) Vitamin C (d) Vitamin D

24. During stress condition which of the following nerves start working?
(a) Sympathetic nerves
(b) Parasympathetic nerves
(c) Autonomic nerves
(d) Cranial nerves

25. The gelatinous membrane covering the sensorys hair cells of the ear is known as
(a) Reissner's membrane
(b) tectorial membrane
(c) basilar membrane
(d) neuro-sensory membrane

26. Nerve cells do not divide because they do not have
(a) nucleus (b) centrosome
(c) Golgi body (d) mitochondria

27. Reflex arcs, which involve no processing in the brain, are beneficial because they permit
(a) instantaneous signaling to motor neurons.
(b) avoidance of dangerous stimuli, even without a previously "learned" response.
(c) immediate response to dangerous stimuli.
(d) All of the above

28. Drugs that alter the permeability of the plasma membrane of a neuron have which of the following effects on nerve impulse conduction?
(a) They prevent movement of sodium and potassium ions into and out of the cell, thereby stopping the transmission of the impulse.
(b) They primarily affect conduction along the axon.
(c) They prevent the release of neurotransmitters at synapses.
(d) All of the above

29. The local depolarization of a receptor-cell membrane is called as
(a) inhibitory postsynaptic potential (or IPSP).
(b) action potential.
(c) resting potential.
(d) threshold potential.

30. Action potentials travel along a neuron because _____.
(a) the neuron cytoskeleton conducts electricity as long as an ion gradient is maintained by the sodium-potassium pump
(b) of cytoplasmic streaming within the neuron
(c) they are pulled along by positive-negative attraction
(d) depolarization of the membrane at one point causes an increase of permeability to sodium at the next point

31. Which one of the following structures constitutes the mammalian forebrain?
(a) Cerebrum and cerebellum
(b) Olfactory bulb
(c) Cerebellum and medulla
(d) Thalamus, hypothalamus, and cerebrum

32. If you electrically stimulate a resting neuron in the middle of its axon and cause it to fire an action potential, which of the following will happen ?
(a) The action potential will propagate toward the axon terminal.
(b) The action potential will propagate toward the cell body.
(c) The action potential will propagate toward both the axon terminal and the cell body.
(d) The action potential will not propagate at all.

33. The resting membrane potential for neuron A is –70mV, while the resting potential for neuron B is –50mV. The threshold voltage for the production of an action potential is –35mV for both neurons. Which of the following statements is *false* ?
(a) Neuron A must depolarize by 35mV to reach the threshold voltage.
(b) Neuron B must hyperpolarize by 15mV to reach the threshold voltage.
(c) The inside of both neurons is negatively charged with respect to the outside.
(d) A single EPSP received by neuron A would cause it to depolarize slightly.

RESPONSE GRID					
	22. (a)(b)(c)(d)	**23.** (a)(b)(c)(d)	**24.** (a)(b)(c)(d)	**25.** (a)(b)(c)(d)	**26.** (a)(b)(c)(d)
	27. (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)	**30.** (a)(b)(c)(d)	**31.** (a)(b)(c)(d)
	32. (a)(b)(c)(d)	**33.** (a)(b)(c)(d)			

Space for Rough Work

34. You are sitting in biology class daydreaming. Your intrinsic heartbeat is controlled by .....
(a) the spinal cord.
(b) the cerebrum.
(c) the medulla.
(d) levels of adrenaline in the blood.

35. The threshold of a neuron is
(a) The amount of inhibitory neurotransmitter required to inhibit an action potential.
(b) The membrane voltage at which an axon potential will be suppressed.
(c) the amount of excitatory neurotransmitter required to elicit an action potential.
(d) The membrane voltage at which the membrane potential develops into an action potential.

36. Which of the following statements about gap juctions or electrical synapses is *false*?
(a) Connexons form molecular tunnels between two cells.
(b) Electrical synapses cannot be inhibitory
(c) Electrical synapses do not allow for temporal summation.
(d) Electrical transmission is very slow and is bidirectional.

37. All but one of the following chemicals are neurotransmitters that function in the human brain. Select the *exception.*
(a) Dopamine (b) Glycine
(c) Atropine (d) Glutamic acid

38. Which of the following cell stop dividing after birth ?
(a) Epithelium (b) Neuron
(c) Glial cells (d) Liver

39. Arbor vitae is composed of
(a) Neuroglea cells (b) Grey matter
(c) White matter (d) All of these

40. Twilight vision is also called
(a) Scotopic vision and is the function of rods
(b) Scotopic vision and is the function of cones
(c) Photopic vision and is the function of rods
(d) Photopic vision and is the function of cones

41. The white matter of the CNS is always
(a) deep to the grey matter
(b) unmyelinated
(c) arranged into tracts
(d) composed of sensory fibers only

42. The pneumotaxic centre in the body is
(a) Heart (b) Lung
(c) Medulla (d) Liver

43. Identify the organ/innervation mismatch
(a) Glossopharyngeal nerve-tongue
(b) Optic nerve-Eye
(c) Facial nerve-Olfactory epithelium
(d) Cochlear nerve-Spiral organ

44. Our ear can hear the frequency of sound waves
(a) 20 to 20,000 cycles/sec
(b) 1000 to 2000 cycles/sec
(c) 5000 to 7000 cycles/sec
(d) 5000 to 10,000 cycles/sec

45. Fenestra ovalis is the opening of –
(a) Cranium (b) Tympanum
(c) Tympanic cavity (d) Brain

RESPONSE GRID					
	34. ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ
	39. ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ
	44. ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ			

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 21 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB22

SYLLABUS : Chemical Co-ordination and Integration

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which hormone possesses anti-insulin effect?
(a) Cortisol (b) Calcitonin
(c) Oxytocin (d) Aldosterone

2. Which of the following is both exocrine and endocrine gland ?
(a) Liver (b) Pancreas
(c) Thyroid (d) Adrenal

3. Chemically hormones are
(a) biogenic amines only
(b) proteins, steroids and biogenic amines
(c) proteins only
(d) steroids only

4. The blood calcium level is lowered by the deficiency of
(a) parathormone
(b) thyroxine
(c) both calcitonin and parathormone
(d) calcitonin

5. The technique used for estimation of minute amounts of hormones and drugs is called
(a) electrophoresis
(b) electroencephalogram
(c) fractionation
(d) radioimmunoassay

6. Testosterone is produced by
(a) sertoli cells (b) leydig's cells
(c) oxyntic cells (d) pituitary gland

7. Which one of the following pairs correctly matches a hormone with a disease resulting from its deficiency?
(a) Luteinizing - Failure of ovulation
(b) Insulin - Diabetes insipidus
(c) Thyroxine - Tetany
(d) Parathyroid - Diabetes mellitus

8. Which one of the following is not a second messenger in hormone action ?
(a) Calcium (b) Sodium
(c) cAMP (d) cGMP

RESPONSE GRID					
1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ		

Space for Rough Work

9. Which of the following statements regarding glucagon is false?
(a) It is secreted by α-cells islets of Langerhans.
(b) It acts antagonistically to insulin.
(c) It decreases blood sugar level.
(d) The gland responsible for its secretion is heterocrine gland.

10. Which one of the following statements is correct?
(a) Neurons regulate endocrine activity, but not *vice versa*.
(b) Endocrine glands regulate neural activity and nervous system regulates endocrine glands.
(c) Neither hormones control neural activity nor the neurons control endocrine activity.
(d) Endocrine glands regulate neural activity but not *vice versa*.

11. Match the source gland with respective hormone as well as the function correctly.

	Source gland	Hormone	Function
(a)	Anterior pituitary	Oxytocin	Contraction of uterus muscles during child birth
(b)	Posterior pituitary	Vasopressin	Stimulates reabsorption of water in the distal tubules in the nephron
(c)	Corpus luteum	Estrogen	Supports pregnancy
(d)	Thyroid	Thyroxine	Regulates blood calcium level

12. Which of the following is incorrect?
(a) Iodine is needed for thyroxine formation.
(b) Calcium regulates the excitibility of nerve fibres.
(c) Potassium plays an important role in the regulation of acid base balance in cell.
(d) Phosphorus helps to maintain the osmotic pressure of the body fluids.

13. Sertoli cells are found in
(a) ovaries and secrete progesterone
(b) adrenal cortex and secrete adrenaline
(c) seminiferous tubules and provide nutrition to germ cells
(d) pancreas and secrete cholecystokinin

14. The phase of menstrual cycle in humans that lasts for 7-8 days, is
(a) follicular phase (b) ovulatory phase
(c) luteal phase (d) menstruation

15. Blood glucose level in man is regulated by:
(a) insulin
(b) adrenaline
(c) glucagon and insulin
(d) All of the above

16. Which of the following glands grows to the maximum size at puberty and then diminishes gradually?
(a) Thymus (b) Pituitary
(c) Thyroid (d) Adrenal

17. Hypoglycemic hormone is
(a) Insulin (b) Glucagon
(c) Thyroxine (d) Calcitonin

18. Which of the following diseases is caused by the under secretion of cortisol?
(a) Anaemia
(b) Addison's disease
(c) Hyperglycemia
(d) Mental illness or retardation

19. Glycogen is converted to glucose by
(a) Insulin
(b) Glucagon
(c) Galactose
(d) Both glucagons and insulin

20. A decrease in the level of oestrogen and progesterone causes
(a) Growth and dilation of myometrium
(b) Growth of endometrium
(c) Constriction of uterine blood vessels leading to sloughing of endometrium or uterine epithelium
(d) Release of ovum from the ovary.

21. Which of the following is a minerelocorticoid?
(a) Calciferol (b) Progesterone
(c) Adrenalin (d) Aldosterone

22. Which hormone interacts with membrane bound receptor and does not normally enter the target cell ?
(a) Follicle stimulating hormone
(b) Estrogen
(c) Thyroxin
(d) Cortisol

RESPONSE GRID					
	9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
	14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
	19. (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)	**22.** (a)(b)(c)(d)	

Space for Rough Work

23. The 24 hour (diurnal) rhythm of our body such as the sleep-wake cycle is regulated by the hormone
(a) Adrenaline (b) Melatonin
(c) Calcitonin (d) Prolactin

24. Steroid hormones transmit their information by
(a) stimulating the receptors present on cell membrance
(b) entering into the cell and modifying cellular contents
(c) entering into the cell and modifying nuclear organization
(d) the help of an intracellular second messenger

25. Increase in bleeding time and delay in blood coagulation is due to the deficiency of which hormone?
(a) Adrenaline (b) Noradrenaline
(c) Parathormone (d) Thyroxine

26. Estrogen and testosterone are steroid hormones, and most likely bind to
(a) membrane ion channels
(b) enzyme-linked membrane reseptors
(c) G-protein coupled membrane receptors
(d) cytoplasmic receptors

27. The only unicellular exocrine glands in our body are
(a) Sweat glands
(b) Mucus secreting goblet cells
(c) Mammary glands
(d) Sebaceous glands

28. Steroid-based hormones are able to act inside the cell. This is possible because
(a) there are no receptors for hormones on the cell surface.
(b) hormones must interact with the nucleus to have an effect.
(c) proteins carry them into the cell.
(d) steroid-based hormones are hydrophobic molecules that can pass through the cell membrane.

29. Every time you eat a cookie or candy bar, your blood sugar increases. This triggers an increase in the hormone
(a) thyroxine. (b) epinephrine.
(c) glucagon. (d) insulin.

30. Target cells
(a) react specifically to a chemical messenger.
(b) have receptors for chemical messengers
(c) secrete hormones
(d) Both a and b

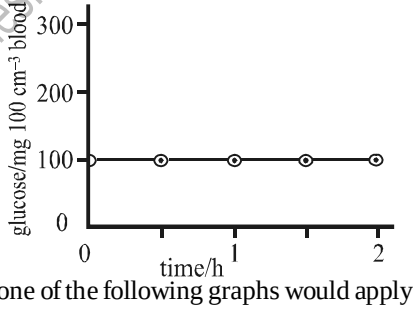
31. Researchers have found increased levels of hormones from the _____ in the blood of students preparing for final exams. These hormones are produced in response to stress.
(a) thyroid gland (b) pineal gland
(c) posterior pituitary (d) adrenal glands

32. Hormones generally cause a response in a cell by
(a) interacting directly with the cell's DNA.
(b) binding with a receptor and stimulating protein production.
(c) changing the polarity of the cell membrane and causing a cascade of events within the cell.
(d) halting all other cellular activity except the required response

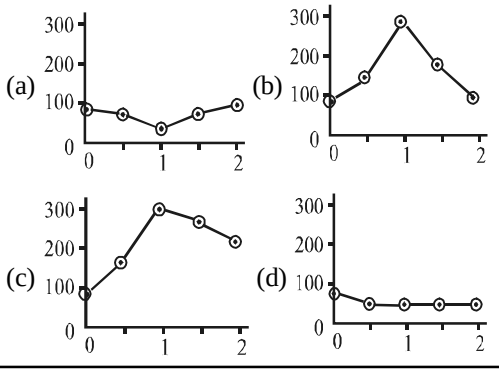
33. Hormones are produced at a particular centralized site and transported throughout the organism by means of
(a) a series of synapses
(b) an integrated neural pathway system.
(c) cellular communication
(d) an internal transport system

34. Injections of a hormone are sometimes given to strengthen contractions of the uterus during childbirth. What hormone might this be?
(a) adrenocorticotropic hormone (ACTH)
(b) thyroxine
(c) oxytocin (d) insulin

35. The graph below illustrates the changes in blood sugar concentration after a healthy man has drunk a glucose solution.



Which one of the following graphs would apply to a diabetic man in similar circumstances ?



RESPONSE GRID					
	23. ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ
	28. ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ
	33. ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ		

Space for Rough Work

36. A paracrine hormone is
(a) a local hormone that acts on the cell that releases it.
(b) always acting on a wide variety of target tissues.
(c) a local hormone produced at one site but active at a different site in the body.
(d) none of the above

37. "Upregulation" of hormone receptors refers to
(a) increase in hormone receptor numbers with low hormone levels.
(b) increase in hormone receptor numbers with high neurotransmitter levels
(c) increase in hormone levels produced by increase in hormone receptor numbers
(d) decrease in hormone levels produced by decrease in hormone receptor numbers

38. In an experiment, researchers removed the ____ of young mice, and as a result, these mice were able to accept organ transplants without rejection.
(a) pineal glands (b) thymus glands
(c) thyroid glands (d) parathyroid glands

39. Which of the following is a common second messenger substance in hormone action ?
(a) Thyroid hormone (b) ADH
(c) Cyclic AMP (d) Epinephrine

40. Which of the following glands is considered the "master" endocrine gland in vertebrates ?
(a) Adrenal glands (b) Thyroid gland
(c) Hypothalamus (d) Pituitary gland

41. Through negative feedback, a hormone may shut off the secretion of an anterior pituitary hormone by :
(a) stimulating the release of a (hypothalamic) releasing hormone
(b) inhibiting the release of a (hypothalamic) inhibiting hormone
(c) inhibiting the release of a (hypothalamic) releasing hormone
(d) all of the preceding.

42. ANF is a peptide hormone and is secrected from
(a) Gastrointestinal tract (b) Kidney
(c) Post. Pituitary (d) None of these

43. Steroid hormones –
(a) have only cell surface receptors
(b) are lipophobic
(c) act through altering the activity of proteins in the target cell
(d) are produced by only adrenal cortex.

44. The hormones that initiate ejection of milk, stimulates milk production and growth of ovarian follicles are respectively known as
(a) PRL, OT and LH (b) OT, PRL and FSH
(c) LH, PRL and FSH (d) PRH, OT and LH

45. A pregnant female deliver a baby who suffers from stunted growth, mental retardation/low intelligence quotient and abnormal skin. This is the result of :
(a) Low secretion of growth hormone
(b) Cancer of the thyroid gland
(c) Over secretion of pars distalis
(d) Deficiency of iodine in diet

RESPONSE GRID					
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 22 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	50
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB23

SYLLABUS : Reproduction in Organism

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which one of the following is not a method of vegetative propagation?
(a) Budding (b) Layering
(c) Sowing (d) Tissue culture

2. A population of genetically identical individuals, obtained from asexual reproduction is
(a) Callus (b) Clone
(c) Deme (d) Aggregate

3. Natural parthenogenesis occurs in:
(a) Protozoans (b) Earthworm
(c) All insects (d) Honeybee

4. Retention of larval characters even after sexual maturity is called
(a) Parthenogenesis (b) Ontogenesis
(c) Paedogenesis (d) Neoteny

5. Asexual reproduction is an effective strategy in stable environments because
(a) gametogenesis is most efficient under these conditions.
(b) the offspring, genetically identical to their parents, are preadapted to the environment.
(c) asexual parthenogenesis produces a large amount of genetic diversity.
(d) animal cells tend to be more totipotent under stable conditions.

6. If you compared the genetic makeup of an animal produced by parthenogenesis with that of its mother, which of the following would you expect?
(a) About 100 percent genetic similarity
(b) About 50 percent genetic similarity
(c) No genetic similarity
(d) Parthenogenetic animals have no mother

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ	6. ⓐⓑⓒⓓ

Space for Rough Work

7. Which of the following statements about animals that utilize external fertilization is *false*?
(a) They are divided equally between terrestrial and aquatic species.
(b) Many produce large numbers of gametes to ensure successful reproduction.
(c) The behaviours associated with mating are often highly synchronized.
(d) The probability of any one egg being fertilized and developing into an adult can be low.

8. Which of the following statements about animal reproduction is *false* ?
(a) Species that reproduce sexually cannot also reproduce asexually.
(b) Viviparity, but not ovoviviparity, is common in mammals.
(c) Male insects can remove spermatophores deposited in a female by other males.
(d) Oogenesis and spermatogenesis both occur in simultaneous hermaphrodites.

9. Which of the following animals qualifies as a sexually reproducing, oviparous species ?
(a) Human (b) Chicken
(c) Kangaroo (d) Sea star

10. Benefits of asexual reproduction include all of the following except
(a) it often allows for the production of many more offspring at the same time
(b) it is advantageous in changing environments in which population variety is the key to successful propagation of a species
(c) it is easier in certain environments to have offspring without searching for a mate
(d) allowing the conservation of resources otherwise allocated to finding mates and performing ritualized courtship.

11. All the 'eyes' of a potato tuber are taken out and it is sown in the ground normally. New plants will
(a) Not emerge (b) Emerge normally
(c) Be weaker (d) Be healthier

12. Basal half of an onion bulb is removed and upper half is sown in the ground. New plant will
(a) Emerge normally (b) Not emerge
(c) Be without leaves (d) Be without flowers

13. A small portion of cane-sugar stem between the two successive nodes is cut off and sown in the soil normally. New plants will
(a) Be formed normally (b) Not be formed
(c) Be without juice (d) Without nodes

14. A cutting of rose plant is thoroughly waxed and planted in the soil normally, It will form
(a) New rose plant
(b) A dead piece of rose stem after some time
(c) A rose plant of improved variety
(d) None of these

15. When an ovary develops into a fruit, without fertilization, it is called
(a) apospory (b) apogamy
(c) parthenocarpy (d) porogamy

16. Asexual reproduction is the best strategy for plants
(a) that are well adapted to their stable environment.
(b) as winter approaches
(c) when new genes must be introduced
(d) that have underground stems.

17. Bamboo reproduces by
(a) rhizomes (b) tubers
(c) corms (d) stolons

18. Grafting is an example of asexual reproduction. Which of the following choices is an example of asexual reproduction involving nonvegetative parts of a plant ?
(a) Apomixis (b) Production of corms
(c) Production of bulbs (d) Production of rhizomes

19. What is necessary for successful grafting to occur ?
(a) Each section must be able to form roots.
(b) The grafted section must be able to form seeds.
(c) Fusion of the two vascular tissues must occur.
(d) Fusion of the two cambial tissues must occur.

20. Banana fruits are seedless, because
(a) auxins are sprayed for rapid development of fruit.
(b) vegetative propagation of plant.
(c) they are triploid plants.
(d) fruits are artificially ripened.

RESPONSE GRID					
	7. (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)
	12. (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)
	17. (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	

Space for Rough Work

21. Consider the following statements and choose the correct option.
(i) The genetic constitution of a plant is unaffected in vegetative propagation.
(ii) Rhizome in ginger serves as an organ of vegetative reproduction.
(iii) Totipotency of cells enables us to micropropagate plants.
(a) Statements (i) and (ii) alone are true
(a) Statements (ii) and (iii) alone are true
(c) Statement (ii) alone is true
(d) All the three statements (i), (ii) and (iii) are true

22. Plants identical to mother plants can be obtained from
(a) seeds (b) stem cutting
(c) Both (a) and (b) (d) None of these

23. Ploidy of ovary, anther, egg, pollen, male gamete and zygote are respectively-
(a) 2n, 2n, n, 2n, n, 2n (b) 2n, 2n, n, n, n, 2n
(c) 2n, n, n, n, n, n (d) 2n, 2n, n, 2n, 2n, 2n

24. Offsprings of oviparous animals are at greater risk as compared to offsprings of viviparous animals because-
(a) Proper embryonic care and protection is lesser
(b) Embryo is not developed
(c) Progenies are with more variation
(d) Progenies are larger

25. The parameter(s) of senescence or old age is/are-
(a) End of the reproductive phase
(b) Concomitant change in body (like slowing metabolism)
(c) Failure of metabolism decreases
(d) Both (a) and (b)

26. The terms homothallic and monoecious are used to denote
(a) bisexual condition (b) unisexual condition
(c) staminate flowers (d) pistillate flowers

27. During regeneration, modification of an organ to other organ is known as
(a) Morphogenesis (b) Epimorphosis
(c) Morphallaxis (d) Accretionary growth

28. Cells become variable in morphology and function in different regions of the embryo. The process is
(a) differentiation (b) metamorphosis
(c) organisation (d) rearrangement

29. Earthworms, sponges, tapeworms are
(a) bisexual animals (b) unisexual animals
(c) hermaphrodites (d) Both (a) and (c)

30. The site of origin of the new plantlets in potato, dahlia, ginger and banana is-
(a) Floral buds present on stem
(b) Internodes of modified stem
(c) Nodes of modified stem
(d) Adventitious buds present on root

31. Among the following which one is not a method of vegetative propagation?
(a) Budding (b) Layering
(c) Sowing (d) Tissue culture

32. Vegetative propagation in mint occurs by:
(a) offset (b) rhizome
(c) sucker (d) runner

33. What is common between vegetative reproduction and apomixis?
(a) Both are applicable to only dicot plants
(b) Both bypass the flowering phase
(c) Both occur round the year
(d) Both produces progeny identical to the parent

34. Individuals of a clone-
(a) Are genetically similar but morphologically different
(b) Are morphologically similar but genetically different
(c) Are morphologically and genetically similar
(d) Are genetically and phenotypically different

35. Some organisms are capable of asexual or sexual reproduction. Under favourable conditions, reproduction proceeds asexually. When conditions become more stressful reproduction switchess to a sexual mode. Why?
(a) Sexual reproduction is simple and more rapid allowing larger numbers of offspring to be produced
(b) Sexual reproduction requires two separate individuals, who can mutually provide nutrient support during stress
(c) Sexual reproduction produces individuals with new combinations of recombined chromosomes increasing diversity
(d) Asexual reproduction requires more energy

RESPONSE GRID					
	21. ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ
	26. ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ
	31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ

Space for Rough Work

36. Apomixis in plant means development of a plant
(a) from root cuttings
(b) without fusion of gametes
(c) from fusion of gametes
(d) from cuttings of stem

37. Which of the following is not vegetative propagule ?
(a) Rhizome and sucker
(b) Tuber and offset
(c) Bulbil (*e.g.* in *Agave*), leaf buds and bulb
(d) Antherozoid

38. Which of the following is false about external fertilization?
(a) Organisms showing external fertilization exhibit great synchrony between the sexes and release gametes.
(b) Gametes are produced in large number in water to enhance the chances of fertilization.
(c) A large number of gametes are wasted.
(d) A major advantage is that the offspring are protected from predators and there is a great chance of their survival upto adulthood.

39. Modified stem present in *Gladiolus* is:
(a) bulb (b) rhizome
(c) corm (d) bulbil

40. Which of the following are seasonal breeders?
(a) Frogs (b) Birds
(c) Lizards (d) All of these

41. Select the wrong statement:
(a) Anisogametes differ either in structure, function or behaviour.
(b) In oomycetes female gamete is smaller and motile, while male gamete is larger and non-motile.
(c) *Chalmydomonas* exhibits both isogamy and anisogamy and *Fucus* shows oogamy.
(d) Isogametes are similar in structure, function and behaviour.

42. Monoecious plant of *Chara* shows occurrence of :
(a) stamen and carpel of the same plant
(b) upper antheridium and lower oogonium on the same plant
(c) upper oogonium and lower antheridium on the same plant
(d) antheridiophore and archegoniophore on the same plant

43. Which of the following statement(s) is/are false about internal fertilization?
(i) Male gametes are motile.
(ii) Male gametes are non-motile.
(iii) Male gametes are produced in large number.
(iv) Male gametes are produced in small number.
(v) There is a significant reduction in the number of eggs produced.
(a) (i), (iii) and (v) (b) (iii) and (iv)
(c) (ii) and (iv) (d) Only (v)

44. Syngamy can occur outside the body of the organism in
(a) Fungi (b) Mosses
(c) Algae (d) Ferns

45. Select the correct sequence from the following.
(i) Juvenile phase → Senescent phase → Reproductive phase
(ii) Juvenile phase → Reproductive phase → Senescent phase
(iii) Reproductive phase → Juvenile phase → Senescent phase
(iv) Vegetative phase → Reproductive phase → Senescent phase
(a) (i) and (ii) (b) (i) and (iv)
(c) (iii) and (iv) (d) (ii) and (iv)

RESPONSE GRID					
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 23 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	55	Qualifying Score	65
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB24

SYLLABUS : Sexual Reproduction in Flowering Plants

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Entry of pollen tube through micropyle is
(a) Chalazogamy (b) Mesogamy
(c) Porogamy (d) Pseudogamy

2. Dry indehiscent single-seeded fruit formed from bicarpellary syncarpous inferior ovary is
(a) Caryopsis (b) Cypsela
(c) Berry (d) Cremocarp

3. One of the most resistant biological material is
(a) lignin (b) hemicellulose
(c) lignocellulose (d) sporopollenin

4. When funiculum, chalaza, and micropyle lie in one straight line, then ovule is called –
(a) Amphitropous (b) Orthotropous
(c) Campylotropous (d) Anatropous

5. Which one of the following is a fruit ?
(a) Ginger (b) Sweet potato
(c) Radish (d) Lady's finger

6. Female gametophyte of angiosperms is represented by
(a) Ovule
(b) Megaspore mother cell
(c) Embryo sac
(d) Nucellus

7. Which of the following pair has haploid structures?
(a) Nucellus and antipodal cells
(b) Antipodal cells and egg cell
(c) Antipodal cells and megaspore mother cell
(d) Nucellus and primary endosperm nucleus

8. Polyembryony commonly occurs in
(a) citrus (b) turmeric
(c) tomato (d) potato

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ		

Space for Rough Work

9. Chasmogamy refers to the condition where –
(a) Flowers remains closed
(b) Flowers are absent
(c) Flowers open
(d) Flowers gamopetalous

10. In oogamy, fertilization involves
(a) a small non-motile female gamete and a large motile male gamete
(b) a large non-motile female gamete and a small motile male gamete
(c) a large non-motile female gamete and a small nonmotile male gamete
(d) a large motile female gamete and a small non-motile male gamete

11. Cotyledons and testa respectively are edible parts in
(a) walnut and tamarind
(b) french bean and coconut
(c) cashew nut and litchi
(d) groundnut and pomegranate

12. A *Polygonum* type of embryo sac is
(a) 7-celled and 8-nucleate
(b) 8-celled and 7-nucleate
(c) 7-celled and 7-nucleate
(d) 8-celled and 8-nucleate

13. In dicot embryo the radicle is formed by
(a) epibasal tier of embryo
(b) hypobasal tier of embryo
(c) hypophysis of suspensor
(d) terminal cell of suspensor

14. A drupe develops in
(a) mango (b) wheat
(c) pea (d) tomato

15. When pollen grains are not transferred from anthers to stigma in a flower, due to the barrier, it is called
(a) herkogamy (b) heterogamy
(c) cleistogamy (d) dichogamy

16. The parenchyma tissue which forms the bulk of ovule where the sporogenous tissue is produced is –
(a) Megaspore mother cell
(b) Nucellus
(c) Ovule
(d) Embryo sac

17. Unisexuality of flowers prevents
(a) autogamy, but not geitonogamy
(b) both geitonogamy and xenogamy
(c) geitonogamy, but not xenogamy
(d) autogamy and geitonogamy

18. Which one of the following represents an ovule, where the embryo sac becomes horse-shoe shaped and the funiculus and micropyle are close to each other?
(a) Amphitropous (b) Circinotropous
(c) Atropous (d) Anotropous

19. If an angiospermic male plant is diploid and female plant tetraploid, the ploidy level of endosperm will be
(a) haploid (b) triploid
(c) tetraploid (d) pentaploid

20. These plants flower and fruit only once in their life time and die after fruiting. These are
(a) monocarpic plants
(b) polycarpic plants
(c) vegetative plants
(d) reproductive plants

21. Select the mismatched pair.
(a) Microsporangium — Pollen sac
(b) Megasporangium — Nucellus
(c) Pollen grain — Male gamete
(d) Embryo sac — Female gametophyte

RESPONSE GRID					
	9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
	14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
	19. (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)		

Space for Rough Work

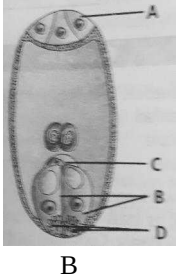
22. A typical angiospermous ovule is attached to the placenta by means of a stalk called X. Body of the ovule fuses with X in the region called Y. Identify X and Y.

	X	Y
(a)	Funicle	Hilum
(b)	Hilum	Funicle
(c)	Funicle	Micropyle
(d)	Hilum	Chalaza

23. Which of the following options is correct?
(a) Transfer of pollen grains from the anther to the stigma of the same flower – Autogamy.
(b) Transfer of pollen grains from the anther of one flower to the stigma of another flower of same plant – Geitonogamy.
(c) Transfer of pollen grains from the anther to the stigma of a genetically different plant – Xenogamy.
(d) All of these

24. Which of the following is not a water pollinated plant?
(a) *Zostera* (b) *Vallisneria*
(c) *Hydrilla* (d) *Cannabis*

25. Identify the parts labelled A, B, C and D in the given figure and select the correct option.



	A	B	C	D
(a)	Synergids	Antipodals	Egg	Filiform apparatus
(b)	Antipodals	Synergids	Egg	Filiform apparatus
(c)	Antipodals	Synergids	Filiform appartus	Egg
(d)	Polar nuclei	Antipodals	Filiform appartus	Egg

26. Growth of pollen tube towards embryo sac is
(a) chemotropic (b) thigmotaxis
(c) geotropic (d) none of these

27. The part of gynoecium that determines the complatible nature of pollen is
(a) stigma (b) style
(c) ovary (d) synergids

28. The innermost layer of anther is tapetum whose function is
(a) dehiscence (b) mechanical
(c) nutrition (d) protection

29. The female gametophyte of a typical dicot at the time of fertilization is
(a) 8-celled (b) 7-celled
(d) 6-celled (d) 5-celled

30. One of the most resistant biological material present in the exine of pollen grain is
(a) pectocellulose (b) sporopollenin
(c) suberin (d) cellulose

31. What is the function of germ pore?
(a) Emergence of radicle
(b) Absorption of water for seed germination
(c) Initiation of pollen tube
(d) All of these

32. How many meiotic divisions are required for the formation of 100 functional megaspores?
(a) 100 (b) 50
(c) 25 (d) 26

33. Study of pollen grains is called
(a) micrology (b) anthology
(c) palynology (d) pomology

RESPONSE GRID					
	22. ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ
	27. ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ			

Space for Rough Work

34. Which of these is a condition that makes flowers invariably autogamous?
(a) Dioecy
(b) Self incompatibilty
(c) Cleistogamy
(d) Xenogamy

35. An embryo may sometimes develop from any cell of embryo sac other than egg. It is termed as
(a) apospory (b) apogamy
(c) parthenogenesis (d) parthenocarpy

36. Endosperm is completely consumed by the developing embryo in
(a) pea and groundnut
(b) maize and castor
(c) castor and groundnut
(d) maize and pea

37. The portion of embryonal axis between plumule (future shoot) and cotyledons is called
(a) hypocotyl (b) epicotyl
(c) coleohize (d) coleoptile

38. Stigma of a flower is removed before pollination. The flower will
(a) Form fruit normally
(b) Not form fruit
(c) Form deformed fruit
(d) Form fruit smaller than normal size

39. In a pea flower, all petals are removed before pollination. The flower will
(a) Form fruit normally
(b) Not form fruit
(c) Form smaller pod
(d) Form deformed pod

40. A drop of glue is placed on the stigma of a flower before pollination. The flower will
(a) Not form fruit
(b) Form normal fruit
(c) Form sticky fruit
(d) Form fruit filled with glue

41. An apomictic seed contains an embryo that is
(a) produced when two sperm fertilize one egg.
(b) developed from one egg alone.
(c) the result of parental self-fertilization
(d) genetically identical to its parent.

42. The embryo is carefully taken out of pea seed and sown in the soil and watered normally. New plant will
(a) Be healthier
(b) Be weaker
(c) Not be formed
(d) Be formed normally

43. Angiospermic plant has chromosome number of 24. The number of chromosomes in pollens will be
(a) 6 (b) 12
(c) 24 (d) 48

44. What is the fate of the seven cells of the embryo sac ?
(a) All but one disintegrate upon fertilization.
(b) Two become fertilized; the others disintegrate.
(c) Two become fertilized; the others fuse to form endosperm.
(d) All are involved in nuclear fusion events.

45. A close relation between flower and pollinating agent is best exhibited by :
(a) *Cocos* (b) *Salvia*
(c) *Yucca* (d) *Avena*

RESPONSE GRID					
	34. ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ
	39. ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ
	44. ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ			

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 24 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB25

SYLLABUS : Human Reproduction

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Breast feeding suspends pregnancy due to
(a) post pregnancy lower levels of FSH and LH
(b) post pregnancy higher levels of FSH and LH which put negative check on ovulation
(c) inhibiting the release of LH by prolactin and thus countering the effects of LH on the ovarian follicles
(d) increasing the release of inhibin by prolactin and thus countering the effects of FSH on the ovarian follicles

2. The human embryo, with 8 to 16 blastomere is called
(a) Morula (b) Blastula
(c) Gastrula (d) Foetus

3. A person which shows the secondary sexual characters of both male and female is called –
(a) Intersex (b) Hermaphrodite
(c) Bisexual (d) Gynandromorph

4. Which one of the following is the correct matching of the events occurring during menstrual cycle?
(a) Proliferative phase: Rapid regeneration of myometrium and maturation of Graffian follicle.
(b) Development of corpus luteum : Secretory phase and increased secretion of progesterone.
(c) Menstruation: Breakdown of myometrium and ovum not fertilised.
(d) Ovulation: LH and FSH attain peak level and sharp fall in the secretion of progesterone.

5. The second maturation division of the mammalian ovum occurs:
(a) in the graafian follicle following the first maturation division
(b) shortly after ovulation before the ovum makes entry into the Fallopian tube
(c) until after the ovum has been penetrated by a sperm
(d) until the nucleus of the sperm has fused with that of the ovum

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

6. Foetal ejection reflex in human female is induced by
(a) release oxytocin from pituitary
(b) fully developed foetus and placenta
(c) differentiation of mammary glands
(d) pressure exerted by amniotic fluid

7. Which one of the following statements about human sperm is correct?
(a) Acrosome has a conical pointed structure used for piercing and penetrating the egg, resulting in fertilisation
(b) The sperm lysine in the acrosome dissolve the egg envelope facilitating fertilisation
(c) Acrosome serves as a sensory structure leading the sperm towards the ovum
(d) Acrosome serves no particular function

8. Sertoli cells are found in
(a) ovaries and secrete progesterone
(b) adrenal cortex and secrete adrenaline
(c) seminiferous tubules and provide nutrition to germ cells
(d) pancreas and secrete cholecystokinin

9. The phase of menstrual cycle in humans that lasts for 7-8 days, is
(a) follicular phase (b) ovulatory phase
(c) luteal phase (d) menstruation

10. Cessation of menstrual cycle in women is called
(a) menopause (b) lactation
(c) ovulation (d) parturition

11. In human female the blastocyst
(a) Forms placenta even before implantation
(b) Gets implanted into uterus 3 days after ovulation
(c) Gets nutrition from uterine endometrial secretion only after implantation
(d) Gets implanted in endometrium by the trophoblast cells

12. Bulbourethral gland is present in
(a) Males and is another name for Uterus masculina
(b) Females and is another name for Bertholin's gland
(c) Males and is another name for Cowper's gland
(d) None of these

13. Which one of the following are rich in fructose, calcium and some enzymes?
(a) Male accessory glands
(b) Liver
(c) Pancreas
(d) Salivary glands

14. Umbilical cord has
(a) Two arteries carrying blood to placenta and one vein returning blood to foetus
(b) One artery carrying blood to placenta and two veins returning blood to foetus
(c) Two arteries bringing blood to foetus and one vein carrying blood to placenta
(d) One artery bringing blood to foetus and two veins carrying blood to placenta

15. Which of the following induces parturition ?
(a) Vasopressin
(b) Oxytocin
(c) Growth hormone
(d) Thyroid stimulating hormone

16. What happens during fertilisation in humans after many sperms reach close to the ovum?
(a) Cells of corona radiata trap all the sperms except one
(b) Only two sperms nearest the ovum penetrate zona pellucida
(c) Secretions of acrosome helps one sperm enter cytoplasm of ovum through zona pellucida
(d) All sperms except the one nearest to the ovum lose their tails

17. The part of fallopian tube closest to the ovary is
(a) isthmus (b) infundibulum
(c) cervix (d) ampulla

18. The chemical substance found in the surface layer of cytoplasm of spermatozoa is:
(a) fertilizin (b) agglutinin
(c) antifertilizin (d) hyaluronidase

RESPONSE GRID					
	6. (a)(b)(c)(d)	**7.** (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)
	11. (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)
	16. (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)		

Space for Rough Work

19. Which of the following diseases is caused by the under secreation of cortisol?
(a) Anaemia
(b) Addison's disease
(c) Hyperglycemia
(d) Mental illness or retardation

20. Reabsorption of chloride ions from glomerular filtrate in kidney tubule occurs by
(a) Active transport (b) Diffusion
(c) Osmosis (d) Brownian movement

21. If for some reason, the vasa efferentia in the human reproductive system get blocked, the gametes will not be transported from
(a) testes to epididymis
(b) epididymis to vas deferens
(c) ovary to uterus
(d) vagina to uterus

22. The nutritive cells found in seminiferous tubules are
(a) Leydig's cells (b) atretic follicular cells
(c) Sertoli cells (d) chromaffin cells.

23. Seminal plasma in humans is rich in
(a) fructose and calcium but has no enzymes
(b) glucose and certain enzymes but has no calcium
(c) fructose and certain enzymes but poor in calcium
(d) fructose, calcium and certain enzymes

24. The function of the secretion of prostate gland is to
(a) inhibit sperm activity
(b) attract sperms
(c) stimulate sperm activity
(d) none of these

25. The head of the epididymis at the head of the testis is called
(d) cauda epididymis
(b) vas deferens
(c) caput epididymis
(d) gubernaculum

26. Which part of ovary in mammals acts as an endocrine gland after ovulation?
(a) Stroma
(b) Germinal epithelium
(c) Vitelline membrane
(d) Graafian follicle

27. The female external genitalia include
(i) Ovary (ii) Mammary gland
(iii) Mons pubis (iv) Clitoris
(a) (i) and (ii) (b) (ii) and (iii)
(c) (iii), (iv) and (v) (d) (ii), (iii) and (v)

28. 2n = 16 is in a primary spermatocyte which is in metaphase of first meiotic division. What shall be the total number of chromatids in each of the secondary spermatocyte?
(a) 16 (b) 24
(c) 32 (d) 8

29. In humans, at the end of the first meiotic division, the male germ cells differentiate into the
(a) spermatids
(b) spermatogonia
(c) primary spermatocytes
(d) secondary spermatocytes

30. The sperms undergo physiological maturation, acquiring increased motility and fertilizing capacity in
(a) seminiferous tubules
(b) vasa efferentia
(c) epididymis
(d) vagina

31. At what stage of life is oogenesis initiated in a human female?
(a) At puberty
(b) During menarch
(c) During menopause
(d) During embryonic development

32. The middle piece of the sperm contains
(a) proteins (b) mitochondria
(c) centriole (d) nucleus

RESPONSE GRID					
	19. ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ
	24. ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ
	29. ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	

Space for Rough Work

33. Corpus luteum is developed from
(a) Graafian follicle (b) nephrostome
(c) oocyte (d) none of these

34. Spermatogenesis is induced by
(a) FSH (b) ICSH
(C) STH (d) ATH

35. Layers of an ovum from outside to inside is
(a) corona radiata, zona pellucida and vitelline membrane
(b) zona pellucida, corona radiata and vitelline membrane
(c) vitelline membrane, zona pellucida and corona radiata
(d) zona pellucida, vitelline membrane and corona radiata

36. Name the hormone that has no role in menstruation.
(a) LH (b) FSH
(c) Estradiol (d) TSH

37. The time for optimum chances of conception in a woman is _____ starting from the day of menstruation.
(a) 1st day (b) 4th day
(c) 14th day (d) 26th day

38. Repair of endometrium is undertaken by
(a) LH (b) FSH
(c) estrogen (d) prolactin

39. The sex of the foetus will be decided at
(a) fertilization by male gamete
(b) implantation
(c) fertilization by female gamete
(d) the start of cleavage

40. Match Column-I with Column-II and select the correct option from the codes given below.

	Column-I		Column-II
A.	Cleavage	(i)	Fertilization
B.	Morula	(ii)	Mitotic divisions
C.	Polyspermy	(iii)	Endometric
D.	Implantation	(iv)	Little mulberry

(a) A-(ii), B-(iv), C-(i), D-(iii)
(b) A-(i), B-(iv), C-(ii), D-(iii)
(c) A-(iv), B-(ii), C-(i), D-(iii)
(d) A-(ii), B-(iv), C-(iii), D-(i)

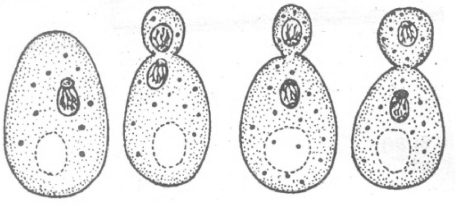
41. Which part of the sperm plays an important role in penetrating the egg membrane?
(a) Allosome (b) Tail
(c) Autosome (d) Acrosome

42. Which of the following hormones is not a secretory product of human placenta?
(a) Human chorionic gonadotropin
(b) Prolactin
(c) Estrogen
(d) Progesterone

43. After birth, colostrum is released from mammary glands which is rich in
(a) fat and low in proteins
(b) proteins and low in fat
(c) proteins, antibodies and low in fat
(d) proteins, fat and low in antibodies

44. The correct sequence in the process of development of human embryo is
(a) fertilization—zygote—cleavage—morula—blastula—gastrula
(b) fertilization—cleavage—morula—zygote—blastula—gastrula
(c) fertilization—zygote—blastula—morula—cleavage—gastrula
(d) cleavage—zygote—fertilization—morula—blastula—gastrula

45. The given figure refers to which type of reproduction in yeast?



(a) Binary fission (b) Budding
(c) Layering (d) Fusion

RESPONSE GRID					
	33. ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ
	38. ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ
	43. ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ		

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 25 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	55	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB26

SYLLABUS : Reproductive Health

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Consider the statements given below regarding contraception and answer as directed thereafter:
(i) Medical Termination of Pregnancy (MTP) during first trimester is generally safe
(ii) Generally chances of conception are nil until mother breast-feeds the infant upto two years
(iii) Intrauterine devices like copper-T are effective contraceptives
(iv) Contraception pills may be taken upto one week after coitus to prevent conception
Which two of the above statements are correct?
(a) ii and iii (b) iii and iv
(c) i and iii (d) i and ii

2. Amniocentesis is a technique
(a) by which the essential amino acids in the body can be estimated
(b) by which any chromosomal anomalies in the foetus can be detected
(c) in which the sex of the foetus can be reversed
(d) that can be used for correcting genetic disorders of the foetus

3. Tying up or removing a small part of fallopian duct is called
(a) Vasectomy (b) Ductus arteriosus
(c) Archidectomy (d) Tubectomy

4. Copper-T is a device that prevents
(a) implantation of blastocyst
(b) ovulation
(c) fertilization
(d) egg maturation

5. The diaphragm, cervical cap and vaults are
(a) Disposable contraceptive devices
(b) Reusable contraceptives
(c) IUDs
(d) Implants

6. The transfer of zygote or early embryo (up to 8 blastomere) into fallopian tube is
(a) IVF and ET (b) ZIFT
(c) GIFT (d) IUT

RESPONSE GRID	1. ⓐⓑⓒⓓ 2. ⓐⓑⓒⓓ 3. ⓐⓑⓒⓓ 4. ⓐⓑⓒⓓ 5. ⓐⓑⓒⓓ 6. ⓐⓑⓒⓓ

Space for Rough Work

7. The technique called gamete intrafallopian transfer (GIFT) is recommended for those females:
(a) who cannot produce an ovum
(b) who cannot retain the foetus inside uterus.
(c) whose cervical canal is too narrow to allow passage for the sperms
(d) who cannot provide suitable environment for fertilisation

8. The copper ions of IUDs
(a) Suppress the motility and fertilization capacity of sperms
(b) Make the uterus unsuitable for implantation
(c) Increase phagocytosis of sperms
(d) Make cervix hostile to sperms

9. Condoms are barriers that cover–
(a) Penis in male and ovary in female.
(b) Penis in male and cervix and vagina in female.
(c) Scrotum in male and cervix and vagina in female.
(d) Cervix in male and vagina in female.

10. Birth control pills check ovulation in female by inhibiting the secretion of –
(a) follicle stimulating hormone
(b) luteinizing hormone
(c) Both (a) and (b)
(d) None of the above

11. Identical twins are produced when
(a) One fertilized egg divides and two blastomeres separate
(b) One sperm fertilizes two eggs
(c) One egg is fertilized with two sperms
(d) Two eggs are fertilized

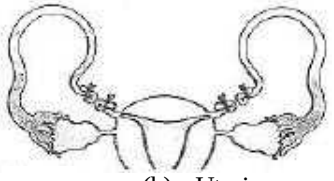
12. Progestasert and LNG-20 are
(a) Implants (b) Copper releasing IUDs
(c) Non-medicated IUDs (d) Hormone releasing IUDs

13. Read the following 4-statements and mark the option that has both correct statements
(i) MTP was legalized in 1971
(ii) Inability to conceive or produce children even after 2 years of unprotected sexual cohabitation is called infertility
(iii) Surgical method of contraception prevents gamete formation
(iv) MTPs are relatively safe up to 12 weeks of pregnancy
(a) (i) and (ii) (b) (ii) and (iii)
(c) (iii) and (iv) (d) (i) and (iii)

14. Medical Termination of Pregnancy (MTP) is considered safe up to how many weeks of pregnancy?
(a) Eight weeks (b) Twelve weeks
(c) Eighteen weeks (d) Six weeks

15. Ultrasound of how much frequency is beamed into human body for sonography ?
(a) 15 – 30 MHZ (b) 1 – 15 MHZ
(b) 45 – 70 MHZ (d) 30 – 45 MHZ.

16. What is the figure given below showing in particular ?



(a) Ovarian cancer (b) Uterine cancer
(c) Tubectomy (d) Vasectomy

17. *In vitro* fertilisation is a technique that involves transfer of which one of the following into the fallopian tube ?
(a) Zygote only
(b) Embryo only, upto 8 cell stage
(c) Either zygote or early embryo upto 8 cell stage
(d) Embryo of 32 cell stage

18. MTP is practised mainly to –
(a) get rid of unwanted female child legally .
(b) get rid of unwanted pregnancies due to failure of contraception.
(c) both (a) and (b).
(d) decrease population size.

19. In amniocentesis, the fluid is taken from –
(a) foetal blood
(b) mother's blood
(c) body fluid of mother
(d) fluid surrounding foetus

20. Which of the following is not *true* about the birth control pill ?
(a) The pill works by preventing ovulation.
(b) The pill works by preventing implantation.
(c) The ovarian cycle is suspended by the birth control pill.
(d) The birth control pill contains low doses of estrogen and progesterone.

21. Which of the following birth control measures can be considered as the safest?
(a) The rhythm method
(b) The use of physical barriers
(c) Temination of unwanted pregnancy
(d) Sterilization techniques

RESPONSE GRID					
	7. ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ
	12. ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ
	17. ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ

Space for Rough Work

22. Using which contraceptive also provides protection from contracting STDs and AIDS ?
(a) Diaphragms (b) Spermicidal foams
(c) Condoms (d) Lactational amenorrhoea

23. Copper-T is a device that prevents
(a) implantation of blastocyst
(b) ovulation
(c) fertilization
(d) egg maturation

24. Cu ions released from copper - releasing Intra Uterine Devices (IUDs):
(a) make uterus unsuitable for implantation
(b) increase phagocytosis of sperms
(c) suppress sperm motility
(d) prevent ovulation

25. Which one of the following is the most widely accepted method of contraception in India, as at present ?
(a) Cervical caps
(b) Tubectomy
(c) Diaphragms
(d) IUDs. (Intra uterine devices)

26. The test-tube Baby Programme employs which one of the following techniques?
(a) Intra cytoplasmic sperm injection (ICSI)
(b) Intra uterine insemination (IUI)
(c) Gamete intra fallopian transfer (GIET)
(d) Zygote intra fallopian transfer (ZIFT)

27. Oral contraceptive pills are composed of
(a) progestrogens only
(b) progestrogen and estrogen combination
(c) progestrogen-testosterone combination
(d) both (a) or (b)

28. Which of the following cannot be detected in a developing foetus by amniocentesis?
(a) Sex of the foetus
(b) Down syndrome
(c) Jaundice
(d) Klinefelter syndrome

29. One of the legal methods of birth control is :
(a) by abstaining from coitus from day 10 to 17 of the menstrual cycle
(b) by having coitus at the time of day break
(c) by a premature ejaculation during coitus
(d) abortion by taking an appropriate medicine

30. One of the following is **not** a method of contraception – which one?
(a) Tubectomy
(b) Condoms
(c) Pills of a combination of oxytocin and vasopressin
(d) Lippes loop

31. Which one of the following statements is correct regarding Sexually Transmitted Diseases (STD)?
(a) The chances of a 5 year boy contacting a STD are very little
(b) A person may contact syphilis by sharing milk with one already suffering from the disease
(c) Haemophilia is one of the STD
(d) Genital herpes and sickle-cell anaemia are both STD

32. The stage transferred into the uterus after induced fertilization of ova in the laboratory is:
(a) Zygote
(b) Embryo at 4 blastomere stage
(c) Embryo at 2 blastomere stage
(d) Morula

33. Reproductive health in society can be improved by –
(i) Introduction of sex education in schools.
(ii) Increased medical assistance.
(iii) Awareness about contraception and STDs.
(iv) Equal opportunities to male and female child.
(v) Ban on aminocentesis.
(vi) Encouraging myths and misconceptions.
(a) All of these (b) (i), (ii), (iv) and (vi)
(c) (i), (ii), (iii), (iv) and (v) (d) (ii) and (v)

34. What is true for " Lactational amenorrhoea"?
(i) It means absence of menstruation.
(ii) Ovulation does not occur during the lactational period.
(iii) Chances of failure of contraception are almost nil upto six months following parturition.
(iv) Side effects are almost nil.
(v) Contraceptive efficiency reduces after the period of intense lactation.
(vi) It is natural method of contraception.
(vii) It increases phagocytosis of sperms
(a) (ii), (iii), (iv), (v) and (vi)
(b) All except (vii)
(c) (ii), (iii), (iv) and (v)
(d) All of these

35. IUDs-
(i) Increase phagocytosis of sperms.
(ii) Release Cu ions that suppress sperm motility and fertilising capacity of sperms.
(iii) Make the uterus unsuitable for implantation.
(iv) Make the cervix hostile to sperms.
(v) Prevent semen from entering the female reproductive tract.
(a) (i), (ii), (iii), (iv) and (v) (b) (i), (ii), (iii) and (iv)
(c) (i) and (ii) (d) (ii), (iii) and (iv)

RESPONSE GRID					
	22. ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ
	27. ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	

Space for Rough Work

36. Match Column -I with Column - II.

Column I	Column II
A. Non-medicated IUDs	(i) Lippes loop
B. Hormone releasing IUDs	(ii) Multiload (iii)7
C. Copper releasing IUDs	(iii) CuT
	(iv) Cu7
	(v) LNG-(ii)0
	(vi) Progestasert

(a) A-(i); B-(ii, vi); C-(iii, iv, v)
(b) A-(i); B-(v, vi); C-(ii, iii, iv)
(c) A-(ii); B-(v, vi); C-(i, iii, iv)
(d) A-(ii); B-(i, vi); C-(iii, iv, v)

37. Progesterone pill helps in preventing pregnancy by not allowing –
(a) ova formation (b) fertilization
(c) implantation (d) None of these

38. The permissible use of the technique amniocentesis is for
(a) detecting sex of the unborn foetus
(b) artificial insemination
(c) transfer of embryo into the uterus of the surrogate mother
(d) detecting any genetic abnormality

39. The family planning programmes in India were initiated in
(a) 1951 (b) 1961
(c) 1971 (d) 1981

40. RCH stands for
(a) Routine Check-up of Health
(b) Reproduction Cum Hygiene
(c) Reversible Contraceptive Hazards
(d) Reproductive and Child Health Care

41. 'Saheli' a new oral contraceptive developed by
(a) All Indian Institute of Medical Science
(b) Central Drug Research Institute
(c) Health Care Pvt. Ltd.
(d) Bharat Immunologicals & Biologicals corp. Ltd.

42. Artificial insemination mean
(a) transfer of sperms of husband to a test tube containing ova.
(b) artificial introduction of sperms of a healthy donor into the vagina.
(c) introduction of sperms of a healthy donor directly into the ovary.
(d) transfer of sperms of a healthy donor to a test tube containing ova.

43. What is true for an ideal contraceptive ?
(i) It should be user-friendly.
(ii) It should be easily available.
(iii) It should be ineffective and reversible with least side effects.
(iv) It should be effective and reversible with least side effects.
(v) It should interfere with the sexual act of the user.
(a) All of these (b) (i), (ii) and (iii)
(c) (i), (ii) and (iv) (d) (i),(ii), (iv) and (v)

44. Choose the correct statements –
(i) According to the WHO, reproductive health is total well-being in the physical, social, emotional, behavioural aspects of reproduction.
(ii) According to the WHO, reproductive health is total well being in the physical, social and emotional aspects of reproduction.
(iii) A reproductively healthy society has people with physically and functionally normal reproductive organs.
(iv) Reproductively healthy societies have abnormal sex-related emotional and behavioural interactions.
(a) (i), (ii) and (iii) (b) (ii) and (iv)
(c) (i) and (iii) (d) (i) only

45. Study the given reasons on the basis of which pregnancy can be terminated. Identify the correct reasons.
(i) To get rid of unwanted pregnancies.
(ii) To prevent the fatality or harmfulness to the mother or to foetus or both due to the continuation of pregnancy.
(iii) Termination of pregnancy is safe in each and every case.
(iv) If the foetus is male.
(v) It plays an important role in decreasing the population.
(a) (i), (ii), only (b) (ii), (iii) only
(c) (iii), (iv), (v) only (d) All of these

RESPONSE GRID					
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 26 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	48	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB27

SYLLABUS : Principles of inheritance and variation

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Cross between AaBB and aaBB will form
(a) 1 AaBB : 1aaBB (b) All AaBB
(c) 3 AaBB : 1 aaBB (d) 1 AaBB : 3 aaBB

2. Red (RR) *Antirrhinum* is crossed with white (WW) one. Offspring RW are pink. This is an example of
(a) dominant -recessive
(b) incomplete dominance
(c) hybrid
(d) supplementary genes

3. The dihybrid ratio in F_2 - generation is
(a) 1 : 1 : 1 : 1 (b) 2 : 1 : 2 : 1
(c) 3:1 (d) 9 : 3 : 3 : 1

4. Genetic map is one that
(a) shows the distribution of various species in a region
(b) establishes sites of the genes on a chromosome
(c) establishes the various stages in gene evolution
(d) show the stages during the cell division

5. A gene pair hides the effect of another gene. The phenomenon is
(a) epistasis (b) dominance
(c) mutation (d) None of the above

6. Independent assortment of genes does not take place when
(a) genes are located on homologous chromosomes
(b) genes are linked and located on same chromosomes
(c) genes are located on non-homologous chromosomes
(d) All the above

7. Extranuclear inheritance occurs in
(a) peroxisome and ribosome
(b) chloroplast and mitochondria
(c) mitochondria and ribosome
(d) chloroplast and lysosome

8. Test cross involves
(a) crossing between two F_1 hybrids
(b) crossing the F_1 hybrid with a double recessive genotype
(c) crossing between two genotypes with dominant trait
(d) crossing between two genotypes with recessive trait

9. When one gene controls two or more different characters simultaneously, the phenomenon is called
(a) apomixis (b) pleiotropy
(c) polyploidy (d) polyteny

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	

Space for Rough Work

10. ABO blood group system is due to
(a) multifactor inheritance
(b) incomplete dominance
(c) multiple allelism
(d) epistasis

11. In humans, male XXY and female XXXX occur due to
(a) aneuploidy
(b) euploidy
(c) Nutosomal syndrome
(d) none of these

12. Haemophilia is more common in males because it is a
(a) Recessive character carried by Y-chromosome
(b) Dominant character carried by Y-chromosome
(c) Dominant trait carried by X-chromosome
(d) Recessive trait carried by X-chromosome

13. The most striking example of point mutation is found in a disease called
(a) thalassemia (b) night blindness
(c) down's syndrome (d) sickle cell anaemia

14. In Down's syndrome of a male child, the sex complement is
(a) XO (b) 45 + XY
(c) 45 + XX (d) XXY

15. Barr body in mammals represents
(a) all the heterochromatin in female cells
(b) Y-chromosomes in somatic cells of male
(c) all heterochromatin in male and female cells
(d) one of the two X-chromosomes in somatic cells of females

16. A person with the sex chromosomes XXY suffers from
(a) Down's syndrome
(b) Klinefelter's syndrome
(c) Turner's syndrome
(d) Gynandromorphism

17. *Drosophila* flies with XXY genotype are females, but human beings with such genotype are abnormal males. It shows that
(a) Y-chromosome is essential for sex determination in *Drosophila*.
(b) Y-chromosome is female determinant in *Drosophila*.
(c) Y-chromosome is male determination in human beings.
(d) Y-chromosome has no role in sex determination either in *Drosophila* or in human beings.

18. Lack of independent assortment of two genes A and B in fruit fly *Drosophila* is due to
(a) repulsion (b) recombination
(c) linkage (d) crossing over

19. Select the **incorrect** statement from the following:
(a) Galactosemia is an inborn error of metabolism
(b) Small population size results in random genetic drift in a population
(c) Baldness is a sex -limited trait
(d) Linkage is an exception to the principle of independent assortment in heredity

20. The "Cri-du-Chat" syndrome is caused by change in chromosome structure involving
(a) deletion (b) duplication
(c) inversion (d) translocation

21. Biometric genetics deals with :
(a) the biochemical explanations of various genetical phenomena
(b) the effect of environment on genetic set up organisms
(c) the genetical radiations on the living organisms
(d) the inheritance of quantitative traits

22. Which one of the following conditions correctly describes the manner of determining the sex in the given example?
(a) Homozygous sex chromosomes (ZZ) determines female sex in birds.
(b) XO type of sex chromosomes determines male sex in grasshopper.
(c) XO condition in human as found in Turner syndrome, determines female sex.
(d) Homozygous sex chromosomes (XX) produces male in *Drosophila.*

23. Select the correct statement from the ones given below with respect to dihybrid cross.
(a) Tightly linked genes on the same chromosome show higher recombinations
(b) Genes far apart on the same chromosome show very few recombinations
(c) Genes loosely linked on the same chromosome show similar recombinations as the tightly linked ones
(d) Tightly linked genes on the same chromosome show very few recombinations

24. Chromosome complement with 2n – 1 is called
(a) Monosomy (b) Trisomy
(c) Nullisomy (d) Tetrasomy

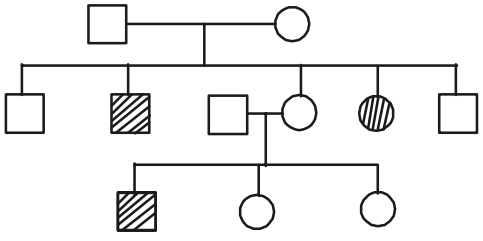
RESPONSE GRID					
	10. ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ
	15. ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ
	20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ

Space for Rough Work

25. In a cross between AABB × aabb, the ratio of F_2 genotypes between AABB, AaBB, Aabb and aabb would be
(a) 9 : 3 : 3 : 1 (b) 2 : 1 : 1 : 2
(c) 1 : 2 : 2 : 1 (d) 7 : 5 : 3 : 1

26. The basis of karyotaxonomy is
(a) Number of nucleoli
(b) Sedimentation rate of ribosomes
(c) Chromosome banding
(d) Chromosome number

27. Study the pedigree chart given below:

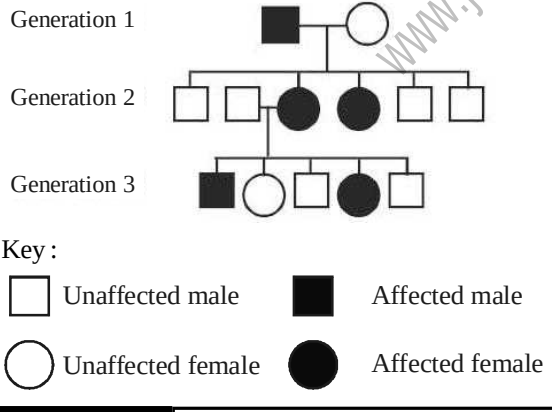


What does it show?
(a) Inheritance of a recessive sex-linked disease like haemophilia
(b) Inheritance of a sex-linked inborn error of metabolism like phenylketonuria
(c) Inheritance of a condition like phenylketonuria as an autosomal recessive trait
(d) The pedigree chart is wrong as this is not possible

28. Which one is a hereditary disease ?
(a) Cataract (b) Leprosy
(c) Blindness (d) Phenylketonuria

29. Diploid chromosome number in humans is
(a) 46 (b) 44
(c) 48 (d) 42

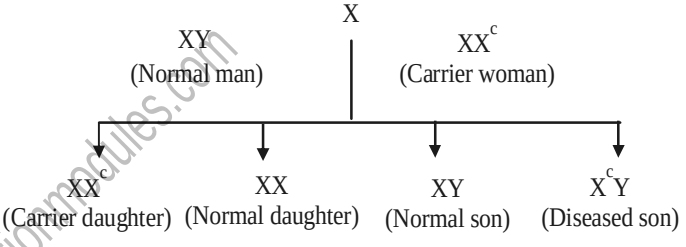
30. Given below is a pedigree chart showing the inheritance of a certain sex-linked trait in humans



The trait traced in the above pedigree chart is
(a) dominant X - linked
(b) recessive X-linked
(c) dominant Y - linked
(d) recessive Y-linked

31. In maize, coloured endosperm (C) is dominant over colourless (c); and full endosoperm (R) is dominant over shrunken (r). When a dihybrid of F_1 generation was test crossed, it produced your phenotypes in the following percentage:
Coloured full - 48% Coloured shrunken - 5%
Colourless full - 7% Colourless shrunken - 40%
From this data, what will be the distance between two non-allelic genes?
(a) 48 units (b) 5 units
(c) 7 units (d) 12 units

32. Inheritance of which of the following traits is shown in the given cross?



(a) X-linked dominant trait
(b) X-linked recessive trait
(c) Autosomal dominant trait
(d) Autosomal recessive trait

33. More than two alternate forms of a gene present on the same locus are called (i). They are produced due to repeated (ii) of the same gene but in different directions. Their well known example is (iii).

	(i)	(ii)	(iii)
(a)	Epistatic genes	Crossing over	polydactyly
(b)	Multiple alleles	mutations	human blood groups
(c)	Supplementary	mutations	hypertrichosis
(d)	Linked genes	Crossing over	aljaptonuria

RESPONSE GRID					
	25. (a)(b)(c)(d)	**26.** (a)(b)(c)(d)	**27.** (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)
	30. (a)(b)(c)(d)	**31.** (a)(b)(c)(d)	**32.** (a)(b)(c)(d)	**33.** (a)(b)(c)(d)	

Space for Rough Work

34. In fruit files, long wing is dominant to vestigial wing. When heterozygous long-winged files were crossed with vestigial-winged files, 192 offsprings were produced. Of these, 101 had long wings and 91 had vestigial wings.
If an exact Mendelian ratio had been obtained, then the number of each phenotype would have been

	Long-winged	Vestigial-winged
(a)	64	128
(b)	96	96
(c)	128	64
(d)	192	0

35. Phenotypic and genotypic ratio is similar in case of
(a) complete dominance
(b) incomplete dominance
(c) over dominance
(d) epistasis

36. To determine the genotype of a tall plant of F_2 generation, Mendel crossed this plant with a dwarf plant. This coss represents a
(a) test cross (b) back cross
(c) reciprocal cross (d) dihybrid cross

37. Match Column-I with Column-II and select the correct option from the codes given below.

	Column-I		Column-II
A.	A single trait controlled by three or more than three alleles	(i)	Pleiotropy
B.	A single trait controlled by three or more than three genes	(ii)	Multiple alleles
C.	A single gene exhibits multiple phenotypic expression	(iii)	Polygenic inheritance

38. Chromosomal theory of inheritanc was given by
(a) Morgan et al (b) Sutton and Boveri
(c) Hugo de Vries (d) Gregor J. Mendel

39. What is true about the crossing over between linked genes?
(a) No crossing over at all
(b) High percentage of crossing over
(c) Hardly any crossing over
(d) None of these

40. Which of the following is incorrect regarding ZW-ZZ type of sex determination?
(a) It occurs in birds and some reptiles
(b) Females are homogametic and males are heterogametic
(c) 1 : 1 sex ratio is produced in the offsprings
(d) All of these

41. Red green colourblindness is a sex linked trait. Which of the given statements is not correct regarding colourblindness?
(a) It is more common in males than in females
(b) Homozygous recessive condition is required for the expression of colourblindness in females
(c) Males can be carriers of the trait
(d) Colourblind women always have colourblind father and always produce colourblind son.

42. At a particular locus, frequency of allele A is 0.6 and that of allele a is 0.4. What would be the frequency of heterozygotes in a random mating population at equilibrium?
(a) 0.36 (b) 0.16
(c) 0.24 (d) 0.48

43. The distance between the genes is measured by
(a) Angstrom (b) map unit
(c) Dobson unit (d) millimetre

44. Which of the following trait is controlled by dominant autosomal genes?
(a) Polydactyly
(b) Huntigton's chorea
(c) PTC (phenylthiocarbomide) tasting
(d) All of these

45. The mutations that involve addition, deletion or substitution of a single base pair in a gene are referred to as
(a) point mutations (b) lethal mutations
(c) silent mutations (d) retrogressive mutations

RESPONSE GRID					
	34. (a)(b)(c)(d)	**35.** (a)(b)(c)(d)	**36.** (a)(b)(c)(d)	**37.** (a)(b)(c)(d)	**38.** (a)(b)(c)(d)
	39. (a)(b)(c)(d)	**40.** (a)(b)(c)(d)	**41.** (a)(b)(c)(d)	**42.** (a)(b)(c)(d)	**43.** (a)(b)(c)(d)
	44. (a)(b)(c)(d)	**45.** (a)(b)(c)(d)			

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 27 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB28

SYLLABUS : Molecular Basis of Inheritance

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which form of RNA has a structure resembling clover leaf?
(a) rRNA (b) hn RNA
(c) m RNA (d) t RNA

2. Other than DNA polymerase, which is/ are the enzyme(s) involved in DNA synthesis?
(a) Topoisomerase (b) Helicase
(c) RNA primase (d) All of these

3. The enzyme used for joining two DNA fragments is called:
(a) ligase (b) restriction endonuclease
(c) DNA polymerase (d) gyrase

4. Nucleotide arrangement in DNA can be seen by
(a) X-ray crystallography
(b) electron microscope
(c) ultracentrifuge
(d) light microscope

5. The okazaki fragments in DNA chain growth
(a) polymerize in the 3' - to - 5' direction and forms replication fork
(b) prove semi-conservative nature of DNA replication
(c) polymerize in the 5' - to - 3' direction and explain 3' - to - 5' DNA replication
(d) result in transcription

6. Reverse transcriptase is
(a) RNA dependent RNA polymerase
(b) DNA dependent RNA polymerase
(c) DNA dependent DNA polymerase
(d) RNA dependent DNA polymerase

7. Telomerase is an enzyme which is a
(a) simple protein
(b) RNA
(c) ribonucleoprotein
(d) repetitive DNA

8. DNA template sequence of CTGATAGC is transcribed over mRNA as
(a) GUCTUTCG (b) GACUAUCG
(c) GAUTATUG (d) UACTATCU

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ		

Space for Rough Work

9. During replication of a bacterial chromosome DNA synthesis starts from a replication origin site and
(a) RNA primers are involved
(b) is facilitated by telomerase
(c) moves in one direction of the site
(d) moves in bi-directional way

10. The enzyme, which helps to cut one strand of DNA duplex to release tension of coiling of two strands is
(a) DNA ligase
(b) DNA polymerase I
(c) topoisomerase
(d) helicase or unwindases

11. Histones are
(a) glycoproteins (b) mucoproteins
(c) basic proteins (d) acid proteins

12. One gene-one enzyme relationship was established for the first time in
(a) *Salmonella typhimurium*
(b) *Escherichia coli*
(c) *Diplocococcus pneumoniae*
(d) *Neurospora crassa.*

13. The transforming principle of *Pneumococcus* as found out by Avery, MacLeod and McCarty was
(a) mRNA (b) DNA
(c) protein (d) polysaccharide

14. How many pair of nucleotides are present in one helix of B- DNA?
(a) 10 (b) 12
(c) 5 (d) 6

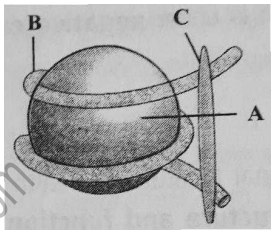
15. Read the following four statements (i - iv).
(i) In transcription, adenosine pairs with uracil.
(ii) Regulation of *lac* operon by repressor is referred to as positive regulation.
(iii) The human genome has approximately 50,000 genes.
(iv) Haemophilia is a sex-linked recessive disease.
How many of the above statements are correct?
(a) Two (b) Three
(c) Four (d) One

16. In negative operon
(a) co-repressor binds with repressor
(b) co-repressor does not bind with repressor
(c) co-repressor binds with inducer
(d) cAMP have negative effect on *lac* operon

17. Transfer of genetic material from one bacterium to another in the transduction process is through
(a) conjugation
(b) bacteriophages
(c) another bacterium
(d) physical contact between donor and recipient strain

18. Telomere and eukaryotic chromosome possesses short segments of
(a) guanine rich repeats.
(b) thymine rich repeats.
(c) cytosine rich repeats.
(d) adenine rich repeats.

19. Refer the given figure of nucleosome and select the option that correctly identifies the parts A, B and C.



	A	B	C
(a)	DNA	Histone octamer	H_1 histone
(b)	Histone octamer	H_1 histone	DNA
(c)	Histone	DNA	H_1 histone
(d)	DNA	H_1 histone	Histone octamer

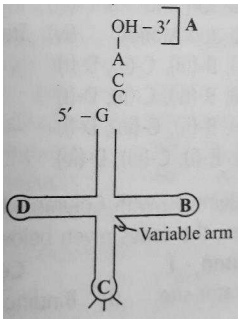
20. The process of transformation is not affected by which of the following enzymes?
A. DNase B. RNase
C. Peptidase D. Lipase
(a) A, B (b) A, B, C, D
(c) B, C, D (d) A, B, C

21. Select the incorrect statement regarding DNA replication
(a) Leading strand is formed is 5' $\rightarrow$ 3' direction
(b) Okazaki fragments are formed in 5' $\rightarrow$ 3' direction
(c) DNA polymerase catalyses polymerisation in 5' $\rightarrow$ 3' direction
(d) DNA polymerase catalyses polymerisation in 3' $\rightarrow$ 5' direction

RESPONSE GRID					
	9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
	14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
	19. (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)		

Space for Rough Work

22. Identify the labels A, B, C and D in the given structure of tRNA and select the correct option.

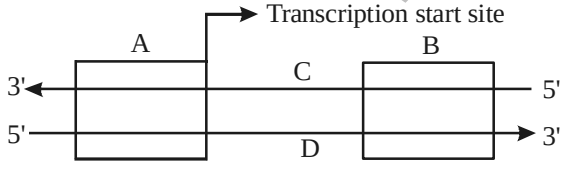


	A	B	C	D
(a)	Anticodon loop	TΨC loop	AA binding stie	DHU loop
(b)	AA binding site	TΨC loop	Anticodon loop	DHU loop
(c)	AA binding site	DHU loop	Anticodon loop	TΨC loop
(d)	AA binding site	DHU loop	TΨC loop	Anticodon loop

23. In one polynucleotide strand of a DNA molecule the ratio of A + T/G + C is 0.3. What is the A + G/T + C ratio of the entire DNA molecule?
(a) 0.3 (b) 0.6
(c) 1.2 (d) 1

24. Chemically, RNA is (i) reactive and (ii) stable as compared to DNA.
(a) (i) equally, (ii) equally
(b) (i) less, (ii) more
(c) (i) more, (ii) less
(d) (i) more, (ii) equally

25. Given diagram represents the components of a transcription unit. Select the correct answer regarding it.



	A	B	C	D
(a)	Teminator	Promoter	Template strand	Coding strand
(b)	Promoter	Terminator	Coding strand	Template strand
(c)	Promoter	Terminator	Template strand	Coding strand
(d)	Terminator	Promoter	Coding strand	Template strand

26. In transcription in eukaryotes, heterogenous nuclear RNA (hnRNA) is transcribed by
(a) RNA polymerase I
(b) RNA polymerase II
(c) RNA polymerase III
(d) all of these

27. What would happen if in a gene encoding a polypeptide of 50 amino acids, 25th codon (UAU) is mutated to UAA?
(a) A polypeptide of 24 amino acids will be formed.
(b) Two polypeptides of 24 and 25 amino acids will be formed
(c) A polypeptide of 49 amino acids will be formed
(d) A polypeptide of 25 amino acids will be formed

28. Regulation of gene expression occurs at the level of
(a) transcription (b) processing/splicing
(c) translation (d) all of these

29. Find out the wrong sentence about heterochromatin.
(a) It is densely packed
(b) It stains dark
(c) It is transcriptionally active
(d) It is late replicating

30. Other than DNA polymerase, which are the enzymes involved in DNA synthesis?
(a) topoisomerase (b) helicase
(c) RNA primase (d) all of these

31. What does "*lac*" refer to in what we call the *lac* operon?
(a) The number 1,00,000 (b) Lactose
(c) Lactase (d) *Lac* insect

32. The error rate of changing an incorrect base with another incorrect base during proofreading is
(a) 1 in 10 bases (b) 1 in 100 bases
(c) 1 in 1,000 bases (d) 1 in 10,000 bases

RESPONSE GRID					
	22. ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ
	27. ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ
	32. ⓐⓑⓒⓓ				

Space for Rough Work

33. DNA fingerprinting refers to
(a) molecular analysis of profiles of DNA samples
(b) analysis of DNA samples using imprinting devices
(c) techniques used for molecular analysis of different specimens of DNA
(d) techniques used for identification of fingerprints of individuals

34. In negative operon
(a) co-repressor binds with repressor
(b) co-repressor does not bind with repressor
(c) co-repressor binds with inducer
(d) cAMP have negative effect on *lac* operon

35. Genes that are involved in turning on or off the transcription of a set of structural genes are called
(a) Operator genes (b) Redundant genes
(c) Regulator genes (d) Polymorphic genes

36. If the gene encoding the *lac* repressor is mutated so that it can no longer bind the operator, will transcription of that operon occur?
(a) Yes, but only when lactose is present.
(b) No, because RNA polymerase is need to transcribe the genes.
(c) Yes, because the operator will not be bound by repressor and RNA polymerase can transcribe the *lac* operon.
(d) No, because cAMP levels are low when the repressor is nonfunctional.

37. Transcriptional regulation in prokaryotes can occur by
(a) a repressor binding an operator and preventing transcription.
(b) an activator binding upstream from a promoter and positively affecting transcription.
(c) different promoter sequences binding RNA polymerase more tightly, resulting in more effective transcriptional initiation.
(d) All of the above

38. Process used for amplication or multiplication of DNA for finger printing is
(a) polymerse chain reaction
(b) nesslerisation
(c) southern blotting
(d) northern blotting

39. Lactose operon produces enzymes
(a) β-galactosidase, permease and glycogen synthetase.
(b) β-galactosidase, permease and transacetylase.
(c) Permease, glycogen synthetase and transacetylase.
(d) β-galactosidase, permease and phosphoglucose isomerase.

40. Satellite DNA
(a) is classified in many categories such as micro-satellites, minisatellites, etc. on the basis of base composition length of segments and number of repetitive units.
(b) normally does not code for any protein.
(c) shows polymorphism.
(d) forms the basis of DNA finger printing.

41. In prokaryotes, gene regulation occurs at the level of
(a) transcription (b) translation
(c) post-transcription (d) post-translation

42. The regulation of tryptophan synthesis in *E. coli* is an example of affecting gene expression through
(a) translational control.
(b) transcriptional control.
(c) homeotic gene control.
(d) breaking down mRNA molecules.

43. Transcription in prokaryotic cell is :
(a) initiated at a promoter using one of three RNA polymerases (RNA polymerase II).
(b) initiated at a start codon with the help of initiation factors and the small subunit of the ribosome.
(c) initiated at a promoter and uses only one strand of DNA, the template strand, to synthesize a complementary RNA strand.
(d) is terminated at stop codons.

44. DNA replication is an _____ process and _____ energy.
(a) exergonic; does not require
(b) endothermic; does require
(c) endergonic; does require
(d) endothermic; does not require

45. Which one of the following triplet codes, is correctly matched with its specificity for an amino acid in protein synthesis or as 'start' or 'stop'codon ?
(a) UAC – Tyrosine (b) UCG – Start
(c) UUU – Stop (d) UGU – Leucine

RESPONSE GRID					
	33. ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ
	38. ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ
	43. ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ		

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 28 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	55	Qualifying Score	65
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB29

SYLLABUS : Evolution

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Genetic drift operates only in
(a) smaller populations
(b) larger populations
(c) mendelian populations
(d) island populations

2. *Archaeopteryx* is connecting link between
(a) Reptiles and birds
(b) Reptiles and mammals
(c) Fishes and reptiles
(d) Chordates and nonchordates

3. Which of the following is true?
(a) Wings of birds and insects are homologous organs.
(b) Human hands and bird's wings are analogous organs.
(c) Human hands and bat's wings are analogous organs.
(d) Flipper of seal and wing of birds are homologous organs.

4. Which one of the following phenomena supports Darwin's concept of natural selection in organic evolution?
(a) Development of transgenic animals.
(b) Production of 'Dolly', the sheep by cloning.
(c) Prevalence of pesticide resistance insects.
(d) Development of organs from 'stem cells' for organ transplantation.

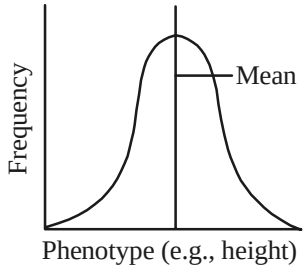
5. What is the correct arrangement of periods of palaeozoic era in ascending order in geological time scale?
(a) Cambrian → Devonian → Ordovician → Silurian → Carboniferous → Permian
(b) Cambrian → Ordovician → Silurian → Devonian → Carboniferous → Permian
(c) Cambrian → Ordovician → Devonian → Silurian → Carboniferous → Permian
(d) Silurian → Devonian → Cambrian → Ordovician → Permian → Carboniferous

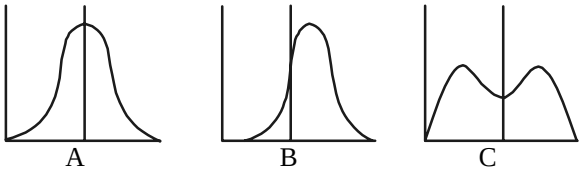
6. The brain capacity of *Homo erectus* was about
(a) 650 cc (b) 900 cc
(c) 1500 cc (d) 1400 cc

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
	6. ⓐⓑⓒⓓ				

Space for Rough Work

7. Following is the digrammatic representation of the operation of natural selection on different traits. Which of the following options correctly identifies all the three graphs A, B and C.





	A	B	C
(a)	Directional	Stabilizing	Disruptive
(b)	Stabilizing	Directional	Disruptive
(c)	Disruptive	Stabilizing	Directional
(d)	Directional	Disruptive	Stabilizing

8. First life form on earth was a
(a) cyanobacterium (b) chemoheterotroph
(c) autotroph (d) photoautotroph

9. The cranial capacity was largest among the
(a) Peking man (b) Java ape man
(c) African man (d) Neanderthal man

10. The Hardy-Weinberg principle cannot operate if
(a) the population is very large
(b) frequent mutations occur in the population
(c) the population has no chance of interaction with other populations
(d) free interbreeding occurs among all members of the population

11. The different forms of interbreeding species that live in different geographical regions are called
(a) sibling species (b) sympatric species
(c) allopatric species (d) polytypic species

12. At a particular locus, frequency of allele A is 0.6 and that of allele a is 0.4. What would be the frequency of heterozygotes in a random mating population at equilibrium?
(a) 0.36 (b) 0.16
(c) 0.24 (d) 0.48

13. On the primitive earth, polymers such as proteins and nucleic acids in aqueous suspension formed the spherical aggregates. These are called
(a) primitosomes (b) liposomes
(c) primitogens (d) coacervates

14. Which of the following evidences does not favour the Lamarckian concept of inheritance of acquired characters?
(a) Lack of pigment in cave-dwelling animals
(b) Melanization in peppered moth
(c) Absence of limbs in snakes
(d) Presence of webbed toes in aquatic birds.

15. Genetic drift is change of
(a) gene frequency in same generation
(b) appearance of recessive genes
(c) gene frequency from one generation to next
(d) None of these

16. The Miller-Urey abiotic synthesis experiment (and other subsequent, similar experiments) showed that...
(a) simple organic molecules can form spontaneously under conditions like those thought to prevail early in the earth's history.
(b) the earliest life forms introduced large amounts of oxygen to the atmosphere.
(c) life can be created in a test tube.
(d) long chains of DNA can form under abiotic conditions.

17. In evolutionary terms, an organism's fitness is measured by its
(a) health
(b) contribution to the gene pool of the next generation
(c) mutation rate
(d) genetic variability

18. Frequency of a character or a mutant gene in a population is expected to increase if the phenotype or its gene is.
(a) dominant (b) favourably selected
(c) recessive (d) sex linked

RESPONSE GRID					
	7. (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)
	12. (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)
	17. (a)(b)(c)(d)	**18.** (a)(b)(c)(d)			

Space for Rough Work

19. In a population of bears, which would be considered the fittest?
(a) The biggest bear
(b) The bear having the largest number of mutations
(c) The bear that blends in with its environment the best
(d) The bear that leaves the most descendants

20. Presence of temporary gill pouches in embryos of snakes. birds and mammals indicates that
(a) these embryos need the pouches for breathing
(b) common ancestor of these animals had gill pouches
(c) lungs evolved from gills
(d) fluid medium in which these embryos develop has abundant

21. Which of the following statements is correct?
(a) Present apes are ancestors of man anatomically
(b) Proconsul was perhaps the common ancestor of apes and man
(c) Proconsul was the ancestor of man and not of apes
(d) None of these

22. What is common to whale, seal and shark?
(a) Thick subcutaneous fat
(b) Convergent evolution
(c) Homoiothermy
(d) Seasonal migration

23. One of the important consequences of geographical isolation is:
(a) preventing speciation
(b) speciation through reproductive isolation
(c) random creation of new species
(d) no change in the isolated fauna

24. Which one of the following in birds, indicates their reptilian ancestry?
(a) Scales on their hind limbs
(b) Eggs with a calcareous shell
(c) Four-chambered heart
(d) Both (a) and (b)

25. Jurassic period of the mesozoic era was characterised by:
(a) Radiation of reptiles and origin of mammal-like reptiles
(b) Dinosaurs become extinct and angiosperms appeared
(c) Flowering plants and first dinosaurs appeared
(d) Gymnosperms were dominant plants and first birds appeared

26. Which one of the following scientists name is correctly matched with the theory put forth by him?
(a) Weismann - Theory of continuity of Germplasm
(b) Pasteur - Inheritance of acquired characters
(c) De Vries - Natural selection
(d) Mendel - Theory of Pangenesis

27. The eye of octopus and eye of cat show different patterns of structure, yet they perform similar function. This is an example of:
(a) Homologous organs that have evolved due to divergent evolution.
(b) Analogous organs that have evolved due to convergent evolution.
(c) Analogous organs that have evolved due to divergent evolution.
(d) Homologous organs that have evolved due to convergent evolution.

28. Variation in gene frequencies within populations can occur by chance rather than by natural section. The is referred to as:
(a) genetic drift
(b) random mating
(c) genetic load
(d) genetic flow

29. The finch species of Galapagos Islands are grouped according to their food sources. Which of the following is not a finch food?
(a) Seeds (b) Carrion
(c) Insects (d) Tree buds

30. Evolution is
(a) progressive development of a race
(b) history and development of a race alongwith variations
(c) history of a race
(d) development of a race

31. Homologous organs are
(a) Wings of Insects and Bat
(b) Gills of Fish and lungs of Rabbit
(c) Pectoral fins of Fish and fore limbs of Horse
(d) Wings of Grasshopper and Crow

RESPONSE GRID					
	19. ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ
	24. ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ
	29. ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ		

Space for Rough Work

32. Theory of inheritance of acquired characters was given by
(a) Wallace (b) Lamarck
(c) Darwin (d) De Vries

33. The kind of evolution in which two species of different geneology come to resemble one another closely, is termed as
(a) progressive evolution
(b) convergent evolution
(c) parallel evolution
(d) retrogressive evolution

34. The presence of gill slits in the embryos of all vertebrates, supports the theory of
(a) biogenesis
(b) recapitulation
(c) metamorphosis
(d) organic evolution

35. The change of the light-coloured variety of peppered moth *(Biston betularia)* to its darker variety *(Biston carbonaria)* is due to
(a) mutation (b) regeneration
(c) genetic isolation (d) temporal isolation

36. Which of the following primate is the closest relative of humans?
(a) Rhesus monkey (b) Orangutan
(c) Gorilla (d) Gibbon

37. Which of the following is the relatively most accurate method for dating of fossils?
(a) Radio-carbon method
(b) Potassium-argon method
(c) Electron-spin resonance method
(d) Uranium-lead method

38. Adaptive radiation refers to
(a) evolution of different species from a common ancestor
(b) migration of members of a species to different geographical areas
(c) power of adaptation in an individual to a variety of environments
(d) adaptations due to geographical isolation.

39. What was the most significant trend in evolution of modern man (*Homo sapiens*) from his ancestors ?
(a) Upright posture
(b) Shortening of jaws
(c) Binocular vision
(d) Increasing brain capacity

40. According to Oparin, which one of the following was ***not*** present in the primitive atmosphere of the earth?
(a) Methane (b) Oxygen
(c) Hydrogen (d) Water vapour

41. There is no life on moon due to the absence of
(a) O_2 (b) water
(c) light (d) temperature

42. Which one of the following statements is correct?
(a) Cro-Magnon man's fossil has been found in Ethiopia
(b) *Homo erectus* is the ancestor of man
(c) Neanderthal man is the direct ancestor of *Homo sapiens*
(d) *Australopithecus* is the real ancestor of modern man

43. Atmosphere of earth just before the origin of life consisted of
(a) water vapours, CH_4, NH_3 and oxygen.
(b) CO_2, NH_3, and CH_2
(c) CH_4, NH_3, H_2 and water vapours.
(d) CH_4, O_3, O_2 and water vapours.

44. The extinct human ancestor who ate only fruits and hunted with stone weapons was
(a) *Ramapithecus* (b) *Australopithecus*
(c) *Dryopithecus* (d) *Homo habilis*

45. Tasmanian Wolf is a marsupial while Wolf is a placental mammal. This shows
(a) convergent evolution
(b) divergent evolution
(c) inheritance of acquired characters
(d) None of these

RESPONSE GRID					
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ
	37. ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ
	42. ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 29 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB30

SYLLABUS : Human Health and Disease

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. A cell coded protein formed in response to infection with most animal viruses is
(a) Antigen (b) Antibody
(c) Interferon (d) Histone

2. A sexually transmitted disease caused by bacteria is
(a) Leprosy (b) AIDS
(c) Syphilis (d) Pertussis

3. What is true about T-lymphocytes in mammals?
(a) These are produced in thyroid
(b) There are of three main types — cytotoxic T-cells, helper T-cells and suppressor T-cells
(c) These originate in lymphoid tissues
(d) They scavenge damaged cells and cellular debris

4. Obstacle to large scale transplantation of organs is
(a) insufficiency of organ donors
(b) immunological rejection of foreign bodies
(c) religious or ethnic considerations
(d) lack of effective surgical techniques

5. The use of *Cannabis* products (bhang, ganja, charas, marijuana or hashish) causes
(a) depression of brain activity and feeling of calmness
(b) alters thoughts, perceptions and feelings
(c) suppresses brain function and relieves pain
(d) stimulates the nervous system and increases alertness and activity.

6. Which one of the following is an Indian medicinal plant ?
(a) *Saccharum officinarum* (b) *Rauwolfia serpentina*
(c) *Oryza sativa* (d) *Solanum melongena*

7. In which one of the following pairs of diseases both are caused by viruses ?
(a) Tetanus and typhoid
(b) Whooping cough and sleeping sickness
(c) Syphilis and AIDS
(d) Measles and Rabies

8. Hypersensitivity to an allergen is associated with
(a) aberrant functioning of the immune mechanism
(b) increase in ambient temperature
(c) age of the individual
(d) food habits

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ		

Space for Rough Work

9. Carcinoma refers to
(a) benign tumours of the connective tissue
(b) malignant tumours of the connective tissue
(c) malignant tumours of the skin or mucous membrane
(d) malignant tumours of the colon

10. Human immuno deficiency virus (HIV) has a protein coat and a genetic material which is
(a) single stranded DNA
(b) double stranded DNA
(c) single stranded RNA
(d) double stranded RNA

11. Short-lived immunity acquired from mother to foetus across placenta or through mother's milk to the infant is categorised as
(a) innate non-specific immunity
(b) active immunity
(c) passive immunity
(d) cellular immunity

12. Which one is a correctly match sexually transmitted disease with its pathogen?
(a) Syphilis – *Leishmania donovani*
(b) AIDS – *Bacillus anthracis*
(c) Urethritis – *Entamoeba gingivalis*
(d) Gonorrhoea – *Neisseria gonorrhoeae*

13. To which type of barriers under innate immunity, do the saliva in the mouth and the tears from the eyes, belong?
(a) Cytokine barriers
(b) Cellular barriers
(c) Physiological barriers
(d) Physical barriers

14. Widal test is used for the diagnosis of
(a) Malaria (b) Pneumonia
(c) Tuberculosis (d) Typhoid

15. Which one of the following depresses brain activity and produced feelings of calmness, relaxation and drowsiness?
(a) Morphine (b) Valium
(c) Amphetamines (d) Hashish

16. Antibodies in our body are complex
(a) steroids (b) prostaglandins
(c) glycoproteins (d) lipoproteins

17. Select the correct statement with respect to diseases and immunisation?
(a) If due to some reason B-and T-lymphocytes are damaged, the body will not produce antibodies against a pathogen
(b) Injection of dead / inactivated pathogens causes passive immunity
(c) Certain protozoans have been used to mass produce hepatitis B vaccine.
(d) Injection of snake antivenom against snake bite is an example of active immunisation

18. Increased asthmatic attacks in certain seasons are related to
(a) eating fruits preserved in tin containers
(b) inhalation of seasonal pollen
(c) low temperature
(d) hot and humid environment.

19. A person likely to develop tetanus is immunised by administering
(a) preformed antibodies
(b) wide spectrum antibiotics
(c) weakened germs
(d) dead germs

20. Which one of the following statements is correct with respect to AIDS?
(a) The HIV can be transmitted through eating food together with an infected person
(b) Drug addicts are least susceptible to HIV infection .
(c) AIDS patients are being fully cured with proper care and nutrition
(d) The causative HIV retrovirus enters helper T-lymphocytes thus reducing their numbers

21. Damage to thymus in a child may lead to –
(a) a reduction in haemoglobin content of blood
(b) a reduction in stem cell production
(c) loss of antibody mediated immunity
(d) loss of cell mediated immunity

RESPONSE GRID					
	9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
	14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
	19. (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)		

Space for Rough Work

22. Thromboplastin is secreted by
(a) platelets (b) lymphocytes
(c) helper T-cells (d) mast cells

23. Which one of the following techniques is safest for the detection of cancers?
(a) Magnetic resonance imaging (MRI)
(b) Radiography (X-ray)
(c) Computed tomography (CT)
(d) Histopathological studies

24. Common cold differs from pneumonia in, that
(a) Pneumonia is caused by a virus while the common cold is caused by the bacterium *Haemophilus influenzae*
(b) Pneumonia pathogen infects alveoli whereas the common cold affects nose and respiratory passage but not the lungs
(c) Pneumonia is a communicable disease whereas the common cold is a nutritional deficiency disease
(d) Pneumonia can be prevented by a live attenuated bacterial vaccine whereas the common cold has no effective vaccine

25. Which one of the following statements is correct with respect to immunity?
(a) Preformed antibodies need to be injected to treat the bite by a viper snake.
(b) The antibodies against small pox pathogen are produced by T – lymphocytes.
(c) Antibodies are protein molecules, each of which has four light chains.
(d) Rejection of a kidney graft is the function of B-lymphocytes.

26. Which of the following pairs contains an infections and a non-infectious disease respectively?
(a) Typhoid and AIDS
(b) AIDS and Cancer
(c) Pneumonia and malaria
(d) Cancer and malaria

27. The comon cold is caused by
(a) Rhino viruses
(b) *Streptococcus pneumoniae*
(c) *Salmonella typhimurium*
(d) *Plasmodium vivax*

28. Elephantiasis, a chronic inflammation that results in gross deformities is caused by
(a) *Ascaris* (b) *E.coli*
(c) *Wuchereria* (d) *Trichophyton*

29. Match Column-I with Column-II and select the correct answer from codes given below.

	Column-I		Column-II
A.	Sporozoites	(I)	Infectious form
B.	Filariasis	(II)	Aedes mosquitoes
C.	Typhoid	(III)	Wuchereria
D.	Chikungunya	(IV)	Widal test

(a) A-(IV), B-(II), C-(I), D-(III)
(b) A-(III), B-(IV), C-(II), D-(I)
(c) A-(II), B-(III), C-(I), D-(IV)
(d) A-(I), B-(III), C-(IV), D-(II)

30. Hepatitis B is transmitted through
(a) sneezing (b) female Anopheles
(c) coughing (d) blood transfusions

31. Which of the following is the bacterial disease in humans?
(a) Dysentery (b) Malaria
(c) Plague (d) Both (a) and (c)

32. The first line of defence in the immune system is provident by
(a) skin and mucous membrane
(b) inflammatory response
(c) the complement system
(d) none of these

33. The most abundant antiody produced against allergens
(a) lgE (b) lgA
(c) lgG (d) lgM

RESPONSE GRID					
	22. (a)(b)(c)(d)	**23.** (a)(b)(c)(d)	**24.** (a)(b)(c)(d)	**25.** (a)(b)(c)(d)	**26.** (a)(b)(c)(d)
	27. (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)	**30.** (a)(b)(c)(d)	**31.** (a)(b)(c)(d)
	32. (a)(b)(c)(d)	**33.** (a)(b)(c)(d)			

Space for Rough Work

34. An auto-immune disease is
(a) SCID
(b) rheumatoid arthritis
(c) myasthenia gravis
(d) both (b) and (c)

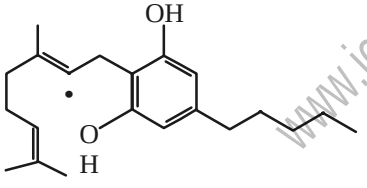
35. The primary lymphoid organs are
(a) spleen and thymus
(b) bone marrow and thymus
(c) bone marrow and lymph node
(d) thymus and MALT

36. Vaccine against polio viruses is an example of
(a) auto-immunization
(b) passive immunization
(c) active immunization
(d) simple immunization

37. Which of the following is celebrated as 'World AIDS Day'?
(a) 31st March (b) 1st March
(c) 1st December (d) 31st December

38. Which of the following approaches are used for the treatment of cancer?
(a) Gene therapy and immunotherapy
(b) Surgery
(c) Radiotherapy and Chemotherapy
(d) All of these

39. Which of these is a member of the group of chemicals whose chemical structure is given below?



(a) Marijuana (b) Hashish
(c) Ganja (d) All of these

40. Which drug is being excessively taken by some sports persons nowadays?
(a) Opioids
(b) Barbiturates
(c) Cannabinoids
(d) Lysergic acid diethyl amides (LSD)

41. Take the odd one out
(a) Rabies, Influenza, AIDS
(b) Amoebiasis, Giardiasis, Trypanosomiasis
(c) Taeniasis, Ascariasis, Elephantiasis
(d) Cancer, Tuberculosis, Tetanus

42. Small proteins produced by vertebrate cells in response to viral infections inhibiting viral multiplication are known as
(a) Lipoproteins (b) Immuglobulins
(c) Interferons (d) Antitoxins

43. Which one of the following acts as a physiological barrier to the entry of micro-organisms in human body ?
(a) Epithelium of urogenital tract
(b) Tears
(c) Monocytes
(d) Skin

44. The treatment of snake-bite by antivenine is an example of
(a) Artificially acquired active immunity
(b) Artificially acquired passive immunity
(c) Naturally acquired passive immunity
(d) Specific natural immunity

45. The drug useful to increase cardiovascular effects in human beings is
(a) Cocaine (b) Barbiturate
(c) Benzodiazepine (d) Insulin

RESPONSE GRID					
	34. ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ
	39. ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ
	44. ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ			

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 30 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	48	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB31

SYLLABUS : Strategies for Enchancement in Food Production

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Parthenocarpic tomato fruits can be produced by
(a) treating the plants with low concentrations of gibberellic acid and auxins
(b) raising the plants from vernalized seeds
(c) treating the plants with phenylmercuric acetate
(d) removing androecium of flowers before pollen grains are released

2. The technique of obtaining large number of plantlets by tissue culture method is called
(a) Plantlet culture
(b) Organ culture
(c) Micropropagation
(d) Macropropagation

3. Breeding of crops with high levels of minerals, vitamins and proteins is called
(a) Somatic hybridisation
(b) Biofortification
(c) Biomagnification
(d) Micropropagation

4. Jaya and Ratna developed for green revolution in India are the varieties of
(a) maize (b) rice
(c) wheat (d) bajra

5. Which one of the following pesticides is banned now a-days?
(a) DDT (b) Eldrin
(c) Aldrin (d) Toxaphene

6. Which one of the following is an exotic Indian fish ?
(a) *Catla catla*
(b) *Heteropneustes fossilis*
(c) *Cyprinus carpio*
(d) *Labeo rohita*

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ	6. ⓐⓑⓒⓓ

Space for Rough Work

7. Consider the following statements concerning food chains :
(i) Removal of 80% tigers from an area resulted in greatly increased growth of vegetation
(ii) Removal of most of the carnivores resulted in an increased population of deers
(iii) The length of food chains is generally limited to 3-4 trophic levels due to energy loss
(iv) The length of food chains may vary from 2 to 8 trophic levels
Which two of the above statements are correct?
(a) (ii) and (iii) (b) (iii) and (iv)
(c) (i) and (iv) (d) (i) and (ii)

8. Which one is a neem product used as insect repellent?
(a) Azadirachtin (b) Rotenone
(c) Parathione (d) Endrin

9. Bull semen for the purpose of artificial insemination is stored in
(a) Ice (b) Liquid oxygen
(c) Liquid nitrogen (d) Liquid CO_2

10. The 'Mule' is the result of
(a) Inbreeding depression
(b) Out breeding
(c) Cross breeding
(d) Inter-specific hybridization

11. In live stock breeding experiments the following stage is transferred to surrogate mothers
(a) Unfertilized eggs
(b) Fertilized eggs
(c) 8 to 32 celled embryo
(d) Frozen semen

12. The animal husbandry deals with the care, breeding and management of
(a) Domesticated animals
(b) Fishes
(c) Honey bees and silk worms
(d) All of these

13. Which of the following has been recently used for increasing productivity of super milk cows?
(a) Artificial insemination by a pedigree bull only
(b) Superovulation of a high production cow only
(c) Embryo transplantation only
(d) A combination of superovulation, artificial insemination and embryo transplantation into a 'carrier cow' (surrogate mother)

14. Which one of the following statements is correct in relation to honey bees?
(a) *Apis indica* is the largest wild honey bee in India
(b) Honey is predominantly sucrose and arabinose
(c) Beewax is a waste product of honey bees
(d) Communication in honey bees was discovered by Karl Von Frisch

15. 'Inland fishery' refers to
(a) Culturing fish in fresh water
(b) Trapping and capturing fishes from sea coast
(c) Deep sea fishing
(d) Extraction of oil from fishes

16. Which of the following combinations is generally recommended for composite fish farming in India?
(a) *Catla, Labeo, Cirrhinus*
(b) *Catla, Cyprinus, Clarias*
(c) *Clarias, Channa, Cyprinus*
(d) *Cirrhinus, Cyprinus, Channa*

17. Hinny is a hybrid of male
(a) Horse and female donkey
(b) Donkey and female horse
(c) Goat and female lamb
(d) Sheep and female goat.

18. When cross is made between two species of the same genus, then the cross is known as
(a) intraspecific hybridization
(b) interspecific hybridization
(c) intergeneric hybridization
(d) intervarietal hybridization

19. Which of the following is a viral disease of poultry birds?
(a) Anthrax (b) Ranikhet
(c) Coccidiosis (d) None of these

RESPONSE GRID					
	7. ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ
	12. ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ
	17. ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ		

Space for Rough Work

20. Which one of the following processes of breeding increases homozygosity?
(a) Inbreeding
(b) Out breeding
(c) Cross breeding
(d) Inter-specific breeding

21. The most popular breed of fowl in India is
(a) White leg horn (b) Aseel
(c) Plymouth (d) Langshan

22. Murrah, Mehsana, Jaffarbadi are breeds of
(a) Buffalo (b) Cow
(c) Cattle (d) Horse

23. Consumption of which one of the following foods can prevent the kind of blindness associated with vitamin 'A' deficiency ?
(a) '*Flavr Savr*' tomato
(b) Canolla
(c) Golden rice
(d) Bt-Brinjal

24. Golden rice is a transgenic crop of the future with the following improved trait :
(a) insect resistance
(b) high lysine (essential amino acid) content
(c) high protein content
(d) high vitamin-A content

25. Use of transgenic plants as biological factories for the production of special chemicals is called–
(a) Molecular farming (b) Molecular genetics
(c) Molecular mapping (d) Dry farming

26. Main objective of production/use of herbicide resistant GM crops is to
(a) eliminate weeds from the field without the use of manual labour
(b) eliminate weeds from the field without the use of herbicides
(c) encourage eco-friendly herbicides
(d) reduce herbicide accumulation in food articles for health safety

27. In order to obtain virus- free plants through tissue culture, the best method is
(a) protoplast culture (b) embryo rescue
(c) anther culture (d) meristem culture

28. A collection of plants and seeds having diverse alleles of all the genes of a crop is called
(a) herbarium (b) germplasm
(c) gene library (d) genome

29. Which one of the following is a wrong matching?
(a) Somatic hybridization - Fusion of two diverse cells
(b) Vector DNA -Site for t-RNA synthesis
(c) Micropropagation - *in vitro* production of plants in large numbers
(d) Callus - Unorganised mass of cell produced in tissue culture

30. In tissue culture roots can be induced by
(a) no cytokinin and only auxins.
(b) higher concentration cytokinin and lower concentration auxins.
(c) lower concentration of cytokinin and higher concentration of auxins.
(d) only cytokinin and no auxins.

31. Three crops that contribute maximum to global food grain production are
(a) Wheat, rice and maize
(b) Wheat, rice and barley
(c) Wheat, maize and sorghum
(d) Rice, maize and sorghum

32. Himgiri developed by hybridisation and selection for disease resistance against rust pathogens is a variety of
(a) chilli (b) maize
(c) sugarcane (d) wheat

33. Bee dances are meant for
(a) Courtship (b) Communication
(c) Recreation (d) Instinct

34. Artificial insemination involves
(a) super ovulation (b) semen collection
(c) egg collection (d) embryo collection

RESPONSE GRID					
	20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ
	25. ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ
	30. ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ

Space for Rough Work

35. The term "breed" refers to
(a) a group of animals not related by descent but similar in most characters
(b) a group of animals related by descent and similar in most characters
(c) a group of animals related by descent but have almost different characteristics
(d) a group of animals neither related by descent nor have similar characteristics.

36. What strategy would you suggest if a person wants to evolve a pureline in an animal?
(a) Cross-breeding (b) Inbreeding
(c) Out-breeding (d) Artificial insemination

37. Select the incorrect statement from the following.
(a) Apiculture provides additional income generating industry to the farmers.
(b) Bee keeping is labour intensive process.
(c) Bee venom is used to cure certain diseases like gout and arthritis.
(d) Honey is used as laxative, antiseptic and sedative.

38. Germplasm collection is the collection of
(a) germ cells
(b) semens
(c) plants/seeds with all the diverse alleles for all genes
(d) egg cells

39. Which of the following diseases is caused by virus?
(a) Tobacco mosaic (b) Late blight of potato
(c) Turnip mosaic (d) Both (a) and (c)

40. Single cell protein can be obtained from
(a) bacteria (b) algae
(c) fungi (d) all of these

41. Meristem culture is used
(a) to produce disease free plants
(b) in germplasm conservation
(c) in rapid clonal multiplication
(d) all of these

42. A plant cell without cell wall is called
(a) proplast (b) protoplast
(c) nucleoplasm (d) explant

43. Refer the given figures and answer the questions.

Which of the following statements is correct regarding the above figures?
(i) These are all Indian hybrid crops of low yielding varieties.
(ii) These are all Indian hybrid crops of high yielding varieties.
(iii) The production of the above crops led to dramatic increase in food production.
(iv) These crops are produced as a result of various plants breeding technique.
(a) (i), (ii), and (iii) (b) (ii), (iii) and (iv)
(c) (iii) and (iv) only (d) (i) and (iii) only

44. Match Column - I with Column - II

Column-I	Column-II
A. Hybrid variety	(I). X-ray
B. Mutation	(II). Allopolyploidy
C. Pure line	(III). F_1 generation
D. *Triticale*	(IV). Selection in self pollinated crops
	(V). Genetic engineering

(a) A-(III); B-(II); C-(I); D-(IV)
(b) A-(III); B-(I); C-(IV); D-(II)
(c) A-(I); B-(III); C-(IV); D-(II)
(d) A-(II); B-(I); C-(III); D-(IV)

45. Farmers in a particular region were concerned that pre-mature yellowing of leaves of a pulse crop might cause decrease in the yield. Which treatment could be most beneficial to obtain maximum seed yield ?
(a) Treatment of the plants with cytokinins along with a small dose of nitrogenous fertilizer
(b) Removal of all yellow leaves and spraying the remaining green leaves with 2, 4, 5- trichlorophenoxy acetic acid
(c) Application of iron and magnesium to promote synthesis of chlorophyll
(d) Frequent irrigation of the crop

RESPONSE GRID					
	35. (a)(b)(c)(d)	**36.** (a)(b)(c)(d)	**37.** (a)(b)(c)(d)	**38.** (a)(b)(c)(d)	**39.** (a)(b)(c)(d)
	40. (a)(b)(c)(d)	**41.** (a)(b)(c)(d)	**42.** (a)(b)(c)(d)	**43.** (a)(b)(c)(d)	**44.** (a)(b)(c)(d)
	45. (a)(b)(c)(d)				

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 31 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	55	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB32

SYLLABUS : Microbes in human welfare

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Select the correct statement from the following.
(a) Biogas is produced by the activity of aerobic bacteria on animal waste
(b) *Methanobacterium* is an aerobic bacterium found in rumen of cattle
(c) Biogas, commonly called gobar gas, is pure methane
(d) Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria

2. Which one thing is not true about antibiotics?
(a) The term "antibiotic" was coined by Selman Waksman in 1942
(b) First antibiotic was discovered by Alexander Flemming
(c) Each antibiotic is effective only against one particular kind of germ
(d) Some persons can be allergic to a particular antibiotic

3. *Monascus purpureus* is a yeast used commercially in the production of :
(a) ethanol
(b) streptokinase for removing clots from the blood vessels.
(c) citric acid
(d) blood cholesterol lowering statins

4. A common biocontrol agent for the control of plant diseases is
(a) Baculovirus (b) *Bacillus thuringiensis*
(c) *Glomus* (d) *Trichoderma*

5. Continuous addition of sugars in 'fed batch' fermentation is done to:
(a) produce methane (b) obtain antibiotics
(c) purify enzymes (d) degrade sewage

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

6. Streptomycin is obtained from
(a) *Streptomyces griseus*
(b) S. *aureofaciens*
(c) S. *venezuelae*
(d) S. *ramosus*

7. For biogas production besides dung an extensive use of which weed is recommended in our country–
(a) *Mangifera indica*
(b) *Hydrilla*
(c) *Eicchornia crassipes*
(d) *Solanum*

8. Chloramphenicol and erythromycin (broad spectrum antibiotics) are produced by
(a) *Streptomyces* (b) *Nitrobacter*
(c) *Rhizobium* (d) *Penicillium*

9. Which one of the microorganism is used for production of citric acid in industries ?
(a) *Lactobacillus bulgaricus*
(b) *Penicillium citrinum*
(c) *Aspergillus niger*
(d) *Rhizopus nigricans*

10. A genetically engineered bacteria used for clearing oil spills is :
(a) *Escherichia coli*
(b) *Bacillus subtilis*
(c) *Agrobacterium tumifacien*s
(d) *Pseudomonas putida*

11. Human insulin is being commercially produced from a transgenic species of
(a) *Escherichia* (b) *Mycobacterium*
(c) *Rhizobium* (d) *Saccharomyces*

12. Which one of the following is not used in organic farming?
(a) *Glomus* (b) Earthworm
(c) *Oscillatoria* (d) Snail

13. What is mode of bacterial resistance against antibiotics ?
(a) Development of thick mucilaginous layer
(b) Alteration of cell membrane
(c) Mutation in bacteria
(d) All the above

14. Which one of the following is a wrong matching of a microbe and its industrial product, while the remaining three are correct ?
(a) Yeast - statins
(b) *Acetobacter aceti* - acetic acid
(c) *Clostridium butylicum* - lactic acid
(d) *Aspergillus niger* - citric acid

15. During anaerobic digestion of organic waste, such as in producing biogas, which one of the following is left undegraded ?
(a) Lipids (b) Lignin
(c) Hemi-cellulose (d) Cellulose

16. Rennin used in cheese industry is –
(a) Antibiotic (b) Enzyme
(c) Alkaloid (d) Inhibitor

17. Vitamin B_{12} is formed during fermentation of
(a) *Ashloya gossipii*
(b) *Rhizopus stalonifer*
(c) *Propionibacteria*
(d) *Saccharomyces cerevisiae*

18. The term "antibiotic" was coined by –
(a) Edward Jenner (b) Louis Pasteur
(c) Selman Waksman (d) Alexander Flemming

19. Which one of the following micro-organisms is used for production of citric acid in industries?
(a) *Penicillium citrinum*
(b) *Aspergillus niger*
(c) *Rhizopus nigricans*
(d) *Lactobacillus bulgaris*

20. Streptokinase which is used as a 'clot buster' obtained from
(a) *Streptococcus* (b) *Staphylococcus*
(c) *Lactobacillus* (d) *Saccharomyces*

RESPONSE GRID					
	6. (a)(b)(c)(d)	**7.** (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)
	11. (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)
	16. (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)

Space for Rough Work

21. Baculoviruses are excellent candidates for
(a) species-specific narrow spectrum pesticidal applications.
(b) species-specific broad spectrum pesticidal applications.
(c) species-specific narrow spectrum insecticidal applications.
(d) species-specific broad spectrum insecticidal applications.

22. Farmers have reported over 50% higher yields of rice by using the biofertilizer
(a) *Azolla pinnata*
(b) *Cyanobacteria*
(c) *Legume-Rhizobium* symbiosis
(d) Mycorrhiza

23. Microbes are present in
(a) soil (b) thermal vents
(c) polluted water (d) all of these

24. Which of the following microbes is a proteinacious infectious agent?
(a) Fungi (b) Prions
(c) Bacteria (d) Protozoa

25. Probiotics are
(a) cancer inducing microbes
(b) new kind of food allergens
(c) live microbial food supplement
(d) safe antibiotics

26. *Saccharomyces cerevisiae* is a yeast commercially used in
(a) citric acid
(b) ethanol
(c) baking
(d) streptokinase for removing clots from blood vessels

27. The masses of bacteria held together by slime and fungal filaments to form mesh like structures are called as
(a) primary sludge (b) flocs
(c) activated sludge (d) anaerobic sludge

28. The purpose of biological treatment of waste water is to
(a) reduce BOD
(b) increase BOD
(c) reduce sedimentation
(d) increase sedimentation

29. These bacteria grow anaerobically on cellulosic material, produce large amount of methane along with CO_2 and H_2, and are collectively called as methanogen. Examples of such bacteria are
(a) *Methanobacterium*
(b) *Methanobrevibacter*
(c) *Methanococcus*
(d) All of these

30. Biogas is produced by
(a) aerobic breakdown of biomass
(b) anaerobic breakdown of biomass
(c) with the help of methanogenic bacteria
(d) both (b) and (c)

31. Match Column-I with Column-II and select the correct answer from the codes given below.

Column-I		Column-II
A. *Trichoderma*	(I)	Nitrification
B. *Streptomyces*	(II)	Biocontrol agent
C. *Nitrosomonas*	(III)	Lactic acid
D. *Lactobacillus*	(IV)	Source of antibiotic

(a) A-(II), B-(III), C-(IV), D-(I)
(b) A-(II), B-(IV), C-(I), D-(III)
(c) A-(III), B-(I), C-(II), D-(IV)
(d) A-(IV), B-(II), C-(I), D-(III)

32. Organic farming does not include
(a) green manures (b) chemical fertilizers
(c) farmyard manures (d) compost

33. The symbiotic association between fungi and roots of higher plants is referred to as
(a) lichen (b) Mycorrhiza
(c) biofertilizer (d) biocontrol agent

34. Which of the following options includes biofertilizers?
(a) Cowdung manure and farmyard waste
(b) A quick growing crop ploughed back into the field
(c) Nostoc, Oscillatoria
(d) All of these

RESPONSE GRID

21. ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ
26. ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ
31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	

Space for Rough Work

35. Yeast *Saccharomyces cervisiae* is used in the industrial production of
(a) butanol (b) citric acid
(c) tetracycline (d) ethanol

36. In cheese manufacture, the micro-organisms are used for
(a) the souring of milk only
(b) the ripening only
(c) development of resistance to spoilage
(d) Both (a) and (b)

37. Brewer's yeast lack
(a) diastase and amylase (b) amylase only
(c) diastase only (d) maltose

38. Baggasse is related to the manufacture of
(a) cinchonidine (b) cellulose materials
(c) resin (d) cane sugar

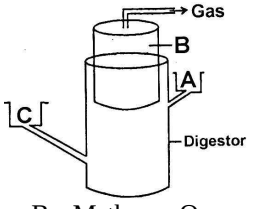
39. Which of the following bacteria is used for the production of butanol and acetone from starch ?
(a) *Lactobacillus bulgaricus*
(b) *Clostridium acetobutylicum*
(c) *Streptococcum thermophilus*
(d) Both (a) and (c)

40. Which bacterium helps in the production of 'Swiss cheese'?
(a) *Propionibacterium sharmanii*
(b) *Trichoderma polysporum*
(c) *Saccharomyces cerevisiae*
(d) *Aspergillus niger*

41. Statins, a bioactive molecule, inhibiting the enzyme responsible for synthesis of
(a) carbohydrate (b) protein
(c) vitamins (d) cholestrol

42. Gallic acid is obtained from
(a) *Pseudomonas species*
(b) *Penicillium purpurogenum*
(c) *Aspergillus niger*
(d) *Streptomyces species*

43. The diagram below shows a typical biogas plant. With few structure labelled as A, B and C. Identify A, B and C.



(a) A – Sludge, B – Methane, Oxygen, C – Dung, water
(b) A – Sludge, B – Methane, Carbon dioxide, C– Dung, water
(c) A – Sludge, B – Ethylin, Carbon dioxide, C – Dung, water
(d) A – Sludge, B – Methane, Carbon dioxide, C – Sewage

44. Match column-I with column-II and choose the correct option

	Column-I		**Column-II**
A.	Statins	I.	Yeast
B.	Ethanol	II.	Blood-cholesterol lowering agent
C.	Dung	III.	Insect-resistant plant
D.	Bt-cotton	IV.	Biogas

(a) A-II; B-I; C-IV; D-III
(b) A-III; B-IV; C-I; D-II
(c) A-I; B-II; C-III; D-IV
(d) A-IV; B- II; C-I; D-III

45. Which one of the following statement regarding BOD is true?
(a) The greater the BOD of waste water, more is its polluting potential.
(b) The greater the BOD of waste water, less is its polluting potential.
(c) The lesser the BOD of waste water, more is its polluting potential.
(d) The lesser the BOD of waste water, less is its polluting potential.

RESPONSE GRID					
35. ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ
40. ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ
45. ⓐⓑⓒⓓ				

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 32 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB33

SYLLABUS : Biotechnology: Principles and Processes

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. The linking of antibiotic resistance gene with the plasmid vector became possible with
(a) DNA ligase
(b) Endonucleases
(c) DNA polymerase
(d) Exonucleases

2. DNA or RNA segment tagged with a radioactive molecule is called
(a) Vector (b) Probe
(c) Clone (d) Plasmid

3. Restriction endonucleases are enzymes which
(a) make cuts at specific positions within the DNA molecule
(b) recognize a specific nucleotide sequence for binding of DNA ligase
(c) restrict the action of the enzyme DNA polymerase
(d) remove nucleotides from the ends of the DNA molecule

4. Agarose extracted from sea weeds finds use in :
(a) Spectrophotometry
(b) Tissue culture
(c) PCR
(d) Gel electrophoresis

5. PCR and Restriction Fragment Length Polymorphism are the methods for :
(a) Study of enzymes
(b) Genetic transformation
(c) DNA sequencing
(d) Genetic Fingerprinting

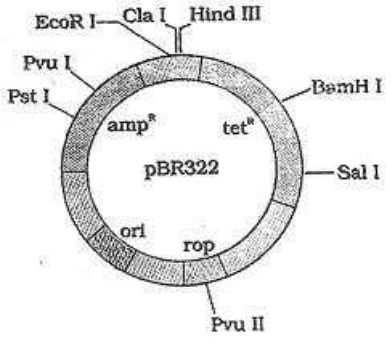
6. 'Cloning' is meant for/to
(a) production of HGH gene in *E. coli*
(b) preserve the genotype of organism
(c) replace the original gene
(d) All of the above

7. Which one of the following is used as vector for cloning genes into higher organisms?
(a) Baculovirus
(b) *Salmonella typhimurium*
(c) *Rhizopus nigricans*
(d) Retrovirus

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ			

Space for Rough Work

8. The figure below is the diagrammatic representation of the *E.Coli* vector pBR 322. Which one of the given options correctly identifies its certain component (s) ?



(a) ori - original restriction enzyme
(b) rop-reduced osmotic pressure
(c) Hind III, EcoRI - selectable markers
(d) amp^R, tet^R - antibiotic resistance genes

9. Electroporation procedure involves
(a) fast passage of food through sieve pores in phloem elements with the help of electric stimulation.
(b) opening of stomatal pores during night by artificial light.
(c) making transient pores in the cell membrane to introduce gene constructs.
(d) purification of saline water with the help of a membrane system.

10. What is the first step in the Southern blot technique?
(a) Denaturation of DNA on the gel for hybridization with specific probe.
(b) Production of a group of genetically identical cells.
(c) Digestion of DNA by restriction enzyme.
(d) Denaturation of DNA from a nucleated cell such as the one from the scene of crime.

11. The polymerase chain reaction (PCR) technology was discovered by
(a) Karry Mullis (b) Saiki *et al*
(c) Craig Venter (d) Maxam and Gilbert

12. For transformation, micro-particles coated with DNA to be bombarded with gene gun are made up of :
(a) Silver or Platinum
(b) Platinum or Zinc
(c) Silicon or Platinum
(d) Gold or Tungsten

13. Plasmid used to construct the first recombinant DNA was isolated from which bacterium species?
(a) *Escherichia coli*
(b) *Salmonella typhimurium*
(c) *Agrobacterium tumefaciens*
(d) *Thermus aquaticus*

14. Genetic engineering is possible because
(a) we can cut DNA at specific sites by restriction endonucleases
(b) restriction endonucleases purified from virus can be used in bacteria
(c) the phenomenon of transduction in bacteria is well understood
(d) we can seen DNA by electron microscope

15. Gel electrophoresis is a
(a) technique of separation of charged molecules under the influence of magnetic field
(b) technique of incorporation of DNA molecules into the cell through transient pores made due to electrical impulses
(c) technique of separation of DNA fragments through the pores of agarose gel under the influence of electric field
(d) technique of separation and purification of gene products.

16. In recombinant DNA technology, the term vector refers to
(a) the enzyme that cuts DNA into restriction fragments
(b) the sticky end of a DNA fragment
(c) a plasmid used to transfer DNA into a living cell
(d) a DNA fragment which carries only ori gene

17. In agarose gel electrophoresis
(a) DNA migrates towards the negative electrode
(b) supercoiled plamids migrate slower than their nicked counterparts
(c) larger molecules migrate faster than smaller molecules
(d) ethidium bromide can be used to visualize the DNA

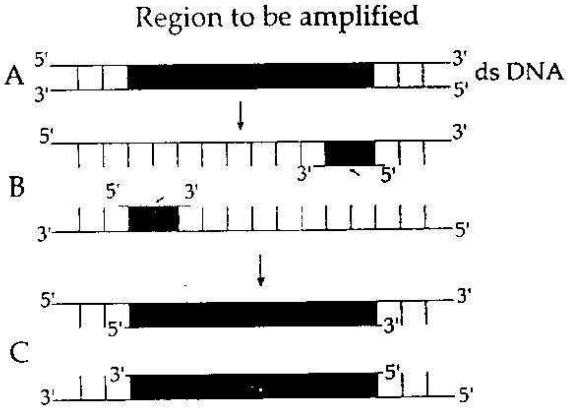
18. Which of the following is based upon the principle of antigen-antibody interaction?
(a) PCR (b) ELISA
(c) R DNA technology (d) RNA

19. Two microbes found to be very useful in genetic engineering are
(a) *Vibrio cholerae* and a tailed bacteriophage
(b) *Diplococcus* sp. and *Pseudomonas* sp.
(c) Crown gall bacterium and *Caenorhabditis elegans*
(d) *Escherichia coli* and *Agrobacterium tumefaciens*

RESPONSE GRID					
	8. (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)
	13. (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)
	18. (a)(b)(c)(d)	**19.** (a)(b)(c)(d)			

Space for Rough Work

20. The figure below shows three steps (A, B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification together with what it represents?



(a) B - Denaturation at a temperature of about 98°C separating the two DNA strands.
(b) A - Denaturation at a temperature of about 50°C.
(c) C - Extension in the presence of heat stable DNA polymerase.
(d) A - Annealing with two sets of primers.

21. Biolistics (gene-gun) is suitable for
(a) DNA finger printing
(b) Disarming pathogen vectors
(c) Transformation of plant cells
(d) Constructing recombinant DNA by joining with vectors

22. Baculoviruses are excellent candidates for
(a) species-specific narrow spectrum pesticidal applications.
(b) species-specific broad spectrum pesticidal applications.
(c) species-specific narrow spectrum insecticidal applications.
(d) species-specific broad spectrum insecticidal applications.

23. Which of the following technique is used for the separation of DNA fragments ?
(a) Gel electrophoresis (b) Chromatography
(c) Transformation (d) Transduction

24. Plasmids are suitable vectors for gene cloning because
(a) these are small circular DNA molecules which can integrate with host chromosomal DNA.
(b) these are small circular DNA molecules with their own replication origin site.
(c) these can shuttle between prokaryotic and eukaryotic cells.
(d) these often carry antibiotic resistance genes.

25. The term "competent" refers to
(a) increasing the competition between cells
(b) making cells impermeable for DNA
(c) increasing the efficiency with which DNA enters the bacterium through pores in its cell wall
(d) making cells permeable for divalent cations

26. The correct sequence of different steps of polymerase chain reaction is
(a) Annealing → Denaturation → Extension
(b) Denaturation → Extension → Annealing
(c) Denaturation → Annealing → Extension
(d) Extension → Denaturation → Annealing

27. Eukaryotic genes do not function properly when cloned into a bacterial cell, because
(a) of high pH present in bacterial cells
(b) of inability to excise introns and destruction by bacterial restriction enzymes
(c) of inappropriate insertion of genes
(d) both (a) and (b).

28. Which structure involved in genetic engineering?
(a) Plastid (b) Plasmid
(c) Codon (d) None of these

29. *Ti*-plasmid used in genetic engineering has been modified by
(a) adding tumour forming genes.
(b) deleting tumour forming genes.
(c) adding genes for endonucleases.
(d) deleting genes for endonucleases.

30. Which of the following technique is used for the detection of RNA fragments ?
(a) Northern blotting (b) Chromatography
(c) Transformation (d) Transduction

31. Which of these is not correctly matched ?
(a) Gene gun—biolistic gun
(b) Plasmids—extrachromosomal DNA
(c) DNA ligase—Biological scissors
(d) Bacteriophages—viruses.

32. Polyethylene glycol method is used for
(a) biodiesel production
(b) seedless fruit production
(c) energy production from sewage
(d) gene transfer without a vector

RESPONSE GRID					
	20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ
	25. ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ
	30. ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ		

Space for Rough Work

33. Which of the following is a molecular scissors?
(a) *EcoR*I (b) *Hind* III
(c) *Bam* H II (d) All of these

34. Rennin used in cheese industry is
(a) antibiotic (b) alkaloid
(c) enzyme (d) inhibitor

35. The primary reason why the same basic techniques can be used to analyze the DNA from species as diverse as bacteria and humans is that
(a) all cells are identical.
(b) every organism has the same amount of DNA.
(c) the DNA sequences of all organisms are the same.
(d) DNA has a consistent structure in all organisms.

36. Which of the following is a plasmid?
(a) pBR 322 (b) *Bam H* I
(c) *Sal* I (d) *Eco R* I

37. There is a restriction endonuclease called *EcoR*I. What does *.co* part in it stand for ?
(a) Colon (b) Coelom
(c) Coenzyme (d) *coli*

38. Restriction endonuclease - *Hind* II always cuts DNA molecules at a particular point by recognizing a specific sequence of
(a) six base pairs. (b) five base pairs.
(c) four base pairs. (d) seven base pairs.

39. Which of the following enzyme is used in case of fungus to cause release of DNA along with other macromolecules ?
(a) Lysozyme (b) Cellulase
(c) Chitinase (d) Amylase

40. Match Column I with Column II and identify the correct option.

	Column - I		**Column - II**
A.	Primers	I.	PCR
B.	Separation and purification of products	II.	C_2H_5OH
C.	Precipitation of DNA	III.	Uptake of foreign DNA by bacterium
D.	Transformation	IV.	Down stream processing

(a) A-IV; B-I; C-II; D-III
(b) A-II; B-I; C-IV; D-III
(c) A-IV; B-I; C-III; D-II
(d) A-I; B-IV; C-II; D-III

41. Which one of the following palindromic base sequences in DNA can be easily cut at about the middle by some particular restriction enzyme?
(a) 5'.....CGTTCG.....3'
3'.....ATGGTA.....5'
(b) 5'.....GATATG.....3'
3'.....CTACTA.....5'
(c) 5'.....GAATTC.....3'
3'.....CTTAAG.....5'
(d) 5'.....CACGTA.....3'
3'.....CTCAGT.....5'

42. During heat shock to the bacterium, the temperature used for giving thermal shock is
(a) 52°C (b) 100°C
(c) liquid nitrogen (d) 42°C

43. Stirred-tank bioreactors have been designed for
(a) addition of preservatives to the product.
(b) purification of the product.
(c) ensuring anaerobic conditions in the culture vessel.
(d) availability of oxygen throughout the process.

44. After completion of biosynthetic stage, the product has to be subjected through a series of processes before it is ready to marketing as a finished product. This series of processes is called
(a) upstream processing (b) downstream processing
(c) elution (d) insertional inactivation

45. Which of the following is not necessary to execute a polymerase chain reaction successfully?
(a) All four DNA bases
(b) Short DNA base primers
(c) DNA polymerase
(d) DNA library

RESPONSE GRID

33. ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ
38. ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ
43. ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ		

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 33 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	48	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB34

SYLLABUS : Biotechnology and its Applications

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Silencing of mRNA has been used in producing transgenic plants resistant to:
(a) bollworms (b) nematodes
(c) white rusts (d) bacterial blights

2. Important objective of biotechnology in agriculture section is –
(a) To produce pest resistant varieties of plants
(b) To increase the nitrogen content
(c) To decrease the seed number
(d) To increase the plant weight

3. Tobacco plants resistant to a nematode have been developed by the introduction of DNA that produced (in the host cells)
(a) both sense and anti-sense RNA
(b) a particular hormone
(c) an antifeedant
(d) a toxic protein

4. Which one of the following techniques made it possible to genetically engineered living organism ?
(a) Recombinant DNA techniques
(b) X-ray diffraction
(c) Heavier isotope labelling
(d) Hybridization

5. Consider the following four statements
(i) The first transgenic buffalo, Rosie produced milk which was human alpha-lactal albumin enriched.
(ii) Restriction enzymes are used in isolation of DNA from other macro-molecules.
(iii) Downstream processing is one of the steps of R-DNA technology.
(iv) Disarmed pathogen vectors are also used in transfer of R-DNA into the host.
Which are the two statements incorrect?
(a) Statement (ii) and (iii)
(b) Statement (iii) and (iv)
(c) Statement (i) and (iii)
(d) Statement (i) and (ii)

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

6. cDNA probes are copied from the messenger RNA molecules with the help of –
(a) Restriction enzymes
(b) Reverse transcriptase
(c) DNA polymerase
(d) Adenosine deaminase

7. In history of biology, human genome project led to the development of :
(a) biotechnology (b) biomonitoring
(c) bioinformatics (d) biosystematics

8. Dolly sheep was obtained by –
(a) Cloning the udder cell (somatic cell) fused with enucleated oocyte
(b) Cloning of gametes
(c) Tissue culture
(d) None of the above

9. Which of the following forms the basis of DNA Finger printing?
(a) The relative proportions of purines and pyrimidines in DNA.
(b) Satellite DNA occurring as highly repeated short DNA segments.
(c) The relative difference in the DNA occurrence in blood, skin and saliva.
(d) The relative amount of DNA in the ridges and grooves of the fingerprints.

10. The genetically-modified (GM) brinjal in India has been developed for:
(a) insect-resistance
(b) enhancing shelf life
(c) enhancing mineral content
(d) drought-resistance

11. Which of the following statement(s) is/are true ?
(i) Biowar is the use of biological weapons against humans and /or their crops and animals.
(ii) Bioethics is the unauthorized use of bioresources and traditional knowledge related to bioresources for commercial benefits.
(iii) Biopatent is exploitation of bioresources of other nations without proper authorisation.
(a) (ii) only (b) (i) only
(c) (i) and (ii) only (d) (i) and (iii) only

12. Which of the following statements is/are correct with regard to the disadvantages of GM crops?
(a) GM crops can affect human health by causing allergic reactions.
(b) Transgenes in commercial crops can endanger native species e.g., the Bt toxin gene expressed in pollen might endanger pollinators like honeybees.
(c) Production of GM crops causes damage to the natural environment and is always costly.
(d) All of these

13. Which of the following genes were introduced in cotton to protect it from cotton bollworms?
(a) Cry Ac and Cry ab
(b) Bt Ac and Bt Ab
(c) Cry IAc and Cry II Ab
(d) Nif genes

14. Hirudin is
(a) a protein produced by *Hordeum vulgare*, which is rich in lysine
(b) a toxic molecuel isolated from *Gossypium hirsutum*, which reduces human fertility
(c) a protein produced from transgenic *Brassica napus* which prevents blood clotting
(d) an antibiotic produced by a genetically engineered bacterium *Escherichia coli*.

15. Early detection of a disease is possible by
(a) PCR
(b) Gene therapy
(c) recombination DNA technology ad ELISA
(d) both (a) and (c)

16. Gene therapy can be referred to as
(a) pre-clinical testing for inherited diseases in new-borns\
(b) treatment of diseases caused by genetic defect
(c) genetic engineering using rDNA technology
(d) cancer treatment using in vitro cultured stem cells

17. Rules of conduct that may be used to regulate our activities in relation to the biological world is called
(a) bioethics (b) biowar
(c) biopatent (d) biopiracy

18. *Flavr Savr* is the transgenic variety of
(a) cotton (b) rice
(c) tomato (d) potato

19. Biopiracy is related to
(a) Traditional knowledge
(b) Biomolecules and regarding bioresources genes isolated from bioresources
(c) Bioresources
(d) All of the above

RESPONSE GRID					
	6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ
	11. ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ
	16. ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ	

Space for Rough Work

20. Genetically engineered bacteria have been used in commercial production of
(a) thyroxine (b) human insulin
(c) testosterone (d) penicillin

21. Golden rice is a promising transgenic crop, when released for cultivation, it will help in
(a) producing petrol like fuel from rice.
(b) alleviation of vitamin A.
(c) pest resistance.
(d) herbicide tolerance.

22. Chloramphenicol and erythromycin (broad spectrum antibiotics) are produced by
(a) *Streptomyces* (b) *Nitrobacter*
(c) *Rhizobium* (d) *Penicillium*

23. The transgenic animals are those which have
(a) foreign DNA in some cells.
(b) foreign DNA in all of their cells.
(c) foreign RNA in all of their cells.
(d) Both (a) and (c).

24. The transgenic plants are the plants having
(a) no gene.
(b) genes in transposition.
(c) genes with no function to perform.
(d) genes of an other organism.

25. Recombinant DNA technology can be used to produce quantities of biologically active form of which one of the following products in *E.coli*?
(a) Luteinizing hormone (b) Ecdyson
(c) Rifamycin (d) Interferon

26. Which of the following combinations of risk are associated with genetically modified food ?
I. Toxicity
II. Allergic reaction
III. Antibiotic resistance in micro-organisms present in alimentary canal. –
(a) I and II (b) I, II and III
(c) I and III (d) II and III

27. Cheese and Yogurt are products obtained by
(a) distillation (b) pasteurization
(c) fermentation (d) dehydration

28. Main objective of producing herbicide resistant GM crops is
(a) encourage ecofriendly herbicides.
(b) reduce herbicide accumulation in food articles for health safety.
(c) eliminate weeds from fields without the use of manual labour.
(d) eliminate weeds from the fields without the use of herbicides.

29. Which one of the following is the correctly matched pair of a product and the microorganism responsible for it ?
(a) Ethyl alcohol- Yeast
(b) Acetic acid- *Lactobacillus*
(c) Cheese - *Nitrobacter*
(d) Curd - *Azotobacter*

30. Humulin is
(a) A form of chitin
(b) A powerful antibiotic
(c) A new digestive enzyme
(d) Human insulin

31. A genetically engineered micro-organism used successfully in bioremediation of oil spills is a species of
(a) *Pseudomonas* (b) *Trichoderma*
(c) *Xanthomonas* (d) *Bacillus*

32. Prenatal screening in humans, AIDS virus testing in humans, and genetic engineering for protection against insect attack in plants all
(a) are types of gene therapy.
(b) are examples of the application of r-DNA technology.
(c) require use of the same restriction enzyme.
(d) are carried out using gene guns.

33. Genetically engineered bovine growth hormone (BGH), which is highly effective for improving overall growth and milk production in cattle, remains a hotly debated issue because
(a) BGH is clearly hazardous to human health.
(b) BGH is an environmental hazard.
(c) BGH could drive traditional family farmers out of business.
(d) scientists remain unconvince d that BGH really works.

34. DNA vaccines are
(a) mixture of hormones (b) recombinant vaccines
(c) synthetic vaccines (d) pure DNA or RNA

35. Toxic component of *Bacillus thuringiensis* is protein. Commercial preparation of *Bacillus thuringiensis* consists of mixture of spores, cry protein and inert carrier. *Bt* stands for *Bacillus thuringiensis* for in popular crop of *Bt* cotton. *Tricoderma* is used in biocontrol of fungal pathogen because it has capacity to secrete the enzyme
(a) DNAase (b) RNAase
(c) Chitinase (d) Cry protein

RESPONSE GRID

20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ
25. ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ
30. ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ
35. ⓐⓑⓒⓓ				

Space for Rough Work

36. GEAC stands for
(a) Genome Engineering Action Committee
(b) Ground Environment Action Committee
(c) Genetic Engineering Approval Committee
(d) Genetic and Environment Approval committee

37. A transgenic food crop'which may help in solving the problem of night blindness in developing countries is
(a) *Flavr Savr* tomatoes (b) Starlink maize
(c) *Bt* Soybean (d) Golden rice

38. Some of the characteristics of Bt cotton are:
(a) long fibre and resistance to aphids
(b) medium yield, long fibre and resistance to beetle pests
(c) high yield and production of toxic protein crystals which kill dipteran pests

39. It is sometimes necessary to genetically engineered mammalian cells to produce proteins because they
(a) can produce larger quantities of protein than bacteria.
(b) can read eukaryotic genes and bacteria cannot.
(c) can add sugars to make glycoproteins and bacteria cannot.
(d) are easier to grow than bacteria.

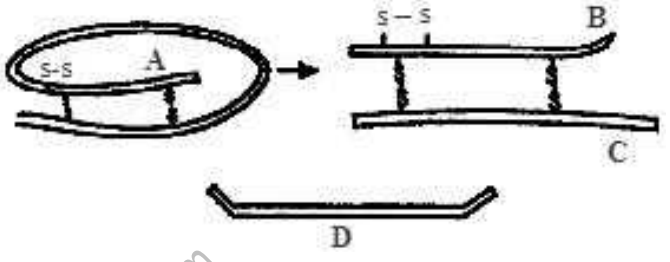
40. Which one of the following is commonly used in transfer of foreign DNA into crop plants?
(a) *Meloidogyne incognita*
(b) *Agrobacterium tumefaciens*
(c) *Penicillium expansum*
(d) *Trichoderma harzianum*

41. α-I antitrypsin is
(a) an antacid
(b) an enzyme
(c) used to treat arthritis
(d) used to treat emphysema

42. Which one of the following genes is defective in patients suffering from severe combined immuno-deficiency syndrome (SCID) ?
(a) RNAase
(b) ADA
(c) Ribonucleotide reductase
(d) DNAase

43. Which one of the following option is incorrect?
(a) The majority of baculoviruses used as biological control agents are in the genus Nucleopolyhedrovirus.
(b) Nucleopolyhedrovirus are excellent model for broad-spectrum insecticidal applications.
(c) Nucleopolyhedrovirus have no negative impacts on plants, mammals, birds, fish or even on non-target insects.
(d) This is especially desirable when beneficial insects are being conserved to aid in an overall IPM programme.

44. Select the correct set of the names for A, B, C and D.



	A	B	C	D
(a)	Proinsulin	B-peptide	A-peptide	Insulin
(b)	Proinsulin	A-peptide	B-Peptide	Free C-Peptide
(c)	Proinsulin	A-peptide	B-peptide	Insulin
(d)	Proinsulin	B-Peptide	A-peptide	Free C-Peptide

45. Match the Column I with Column II and choose the correct option.

	Column I		Column II
A.	Golden rice	I.	Increased shelf life
B.	Flavr Savr tomato	II.	HGH
C.	Mouse	III.	Vitamin A
D.	Transgenic pig	IV.	Organ transplantation

(a) A-III; B-I; C-II; D-IV
(b) A-II; B-I; C-III; D-IV
(c) A-II; B-III; C-I; D-IV
(d) A-IV; B-I; C-II; D-III

RESPONSE GRID					
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐ(ⓒⓓ		**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 34 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB35

SYLLABUS : Organisms and Populations

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which part of the world has a high density of organisms?
(a) Grasslands
(b) Savannahs
(c) Deciduous forests
(d) Tropical rain forests

2. Competition for light, nutrients and space is most severe between
(a) closely related organism growing in different habitats
(b) closely related organisms growing in the same habitat
(c) distantly related organisms growing in the same habitat
(d) distantly related organisms growing in different habitats

3. A mutually beneficial association necessary for survival of both partners is
(a) mutualism/symbiosis (b) commensalism
(c) amensalism (d) both (a) and (b)

4. Praying mantis is a good example of
(a) warning colouration
(b) social insects
(c) camouflage
(d) mullerian mimicry

5. In increasing order of organizational complexity, which one of the following is the correct sequence?
(a) Population, species, community, ecosystem
(b) Population, variety, species, ecosystem
(c) Population, ecosystem, species, community
(d) Species, variety, ecosystem, community

6. Keystone species in an ecosystem are those
(a) present in maximum number
(b) that are most frequent
(c) attaining a large biomass
(d) contributing to ecosystem properties

7. Niche overlap indicates
(a) two different parasites on the same host
(b) sharing of one or more resources between the two species
(c) mutualism between two species
(d) active cooperation between two species

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ			

Space for Rough Work

8. Animals that can tolerate a narrow range of salinity are
(a) stenohaline (b) euryhaline
(c) anadromous (d) catadromous

9. Human population growth in India
(a) tends to follow a sigmoid curve as in case of many other animal species
(b) tends to reach a zero population growth as in case of some animal species
(c) can be reduced by permitting natural calamities and enforcing birth control measures
(d) can be regulated by following the national programme of family planning

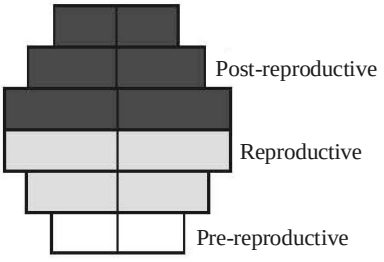
10. Consider the following four conditions (i) - (iv) and select the correct pair of them as adaptation to environment in desert lizards.
The conditions :
(i) Burrowing in soil to escape high temperature
(ii) Losing heat rapidly from the body during high temperature
(iii) Bask in sun when temperature is low
(iv) Insulating body due to thick fatty dermis
(a) (iii), (iv) (b) (i)
(c) (iii), (ii), (iv) (d) (i), (ii)

11. A force acting against achievement of highest possible level of population growth is
(a) Carrying capacity
(b) Environment resistance
(c) Population pressure
(d) Saturation level

12. Natality is the characteristic of a population which means
(a) the total number of individuals present per unit area at a given time
(b) the increase in number of individuals in a population under given environmental conditions
(c) loss of individuals due to death in a population under given environmental conditions
(d) the movement of individuals into and out of population

13. The number of births per thousand people in the population is expressed as :
(a) Reproduction rate (b) Conception rate
(c) Crude birth rate (d) Growth rate

14. What type of human population is represented by the following age pyramid?



(a) Vanishing population
(b) Stable population
(c) Declining population
(d) Expanding population

15. The logistic population growth is expressed by the equation:
(a) $dt/dN = Nr\left(\frac{K-N}{K}\right)$
(b) $dN/dt = rN\left(\frac{K-N}{K}\right)$
(c) $dN/dt = rN$
(d) $dN/dt = rN\left(\frac{N-K}{N}\right)$

16. What is the best pH of soil for cultivation of plants ?
(a) 3.4 – 5.4 (b) 6.5 – 7.5
(c) 4.5 – 8.5 (d) 5.6 – 6.5

17. The maintenance of internal favourable conditions, by a self-regulated mechanism, inspite of the fact that there are changes in the environment, is known as
(a) entropy (b) enthalpy
(c) steady state (d) homeostasis

18. Two different species cannot live for long duration in the same niche or habitat. This law is
(a) Allen's law
(b) Gause's hypothesis
(c) Dollo's rule
(d) Weisman's theory

19. One of the important consequences of geographical isolation is
(a) preventing speciation
(b) speciation through reproductive isolation
(c) random creation of new species
(d) no change in the isolated fauna.

RESPONSE GRID					
	8. ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ
	13. ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ
	18. ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ			

Space for Rough Work

20. Which one of the following areas in India, is a hotspot of biodiversity?
(a) Eastern Ghats (b) Gangetic Plain
(c) Sunderbans (d) Western Ghats

21. A taxon facing an extremely high risk of extinction in wild in the immediate future is called :
(a) critical endangered
(b) endangered
(c) vulnerable
(d) extinct in wild

22. The species that invade a bare area are called
(a) keystone species (b) extinct species
(c) pioneer species (d) rare species

23. Several plant and animal species present together at a place constitute a
(a) genus (b) population
(c) biome (d) community

24. Deserts, rainforests, tundra, etc. are example of
(a) community (b) biome
(c) ecosystem (d) population

25. Life is sustainable with water only because
(a) it makes 90% of the protoplasm
(b) translocation of nutrients inside the body occurs with the help of water
(c) water loss in form of sweating and transpiration helps to maintain body temperature
(d) all of these

26. Which of the following algae are found in deepest ocean waters?
(a) Red algae (b) Yellow algae
(c) Green algae (d) Brown algae

27. When organisms change their location to escape from harsh environment, it is called as
(a) hibernation (b) vernalization
(c) migration (d) aestivation

28. Species interaction with negative influence on both is referred to as
(a) amensalism (b) mutualism
(c) commensalism (d) competition

29. Total number of individual of a species per unit area and per unit time is called
(a) population size
(b) population density
(c) demography
(d) population dyamics.

30. In a life table, the number of individuals alive at the begining of the 1st year to 2nd year interval is 800. During this interval, 200 individuals die. The death rate for this interval is
(a) 0.25 (b) 200
(c) 800 (d) 0.2

31. Which one of the following is the most productive ecosystem?
(a) Temperate forest (b) Grassland
(c) Desert (d) Tropical rain forest

32. Pedology is the study of –
(a) Locomotion of animals
(b) Rocks
(c) Soil
(d) Reproduction

33. Sequence of humification and mineralisation is-
(a) Dead organic matter → Litter → Duff → Humus → Minerals
(b) Humus → Minerals → Litter → Duff
(c) Minerals → Humus → Litter → Duff
(d) Dead organic matter → Duff → Litter → Minerals → Humus

34. Soil is composed of –
(a) Mineral + Water + Air
(b) Mineral + Organic matter + Water
(c) Mineral + Organic matter + Air + Water
(d) Organic matter + Water

35. Who employed the term ecology to study plants ?
(a) Haeckel (b) Odum
(c) Warming (d) Dudgeon

36. Biotic factors are –
(a) Chemical factors of soil which effect life
(b) Physical factors of soil which effect life
(c) All living organisms which influence other organisms
(d) Atmospheric factors which influence life

RESPONSE GRID					
	20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ
	25. ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ
	30. ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ
	35. ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ			

Space for Rough Work

37. The age of pyramid with broad base indicates
(a) High percentage of young individuals
(b) Low percentage of young individuals
(c) High percentage of old individuals
(d) Low percentage of old individuals

38. Permafrost is the most distinctive feature of
(a) Taiga (b) Temperate grasslands
(c) Tundra (d) Pacific northwest

39. Which statement does not reflect a reason why grasses predominate in savannas ?
(a) There are few native herbivores in this biome.
(b) Grasses grow well in fine, sandy soils.
(c) The above ground portions of grass plants die during dry seasons.
(d) The deep roots of the grasses can survive many months of drought.

40. Desert regions are characterized by ___ centimeters of rainfall per year.
(a) less than 5 (b) less than 15
(c) less than 25 (d) over 50

41. To avoid summer - related problems such as heat and dessication fish undergoes
(a) hibernation (b) diapause
(c) aestivation (d) none of these

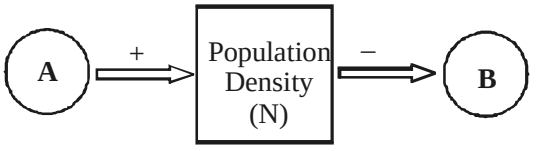
42. Seals have a thick layer of fat (blubber) below their skin that acts as an
(a) thermostat (b) capacitor
(c) resistor (d) insulator

43. Match the following

	Population		Example
A.	Predation	I.	*Cuscuta* and hedge plants
B.	Commensalism	II.	*Balanus* and *Chathamalus*
C.	Parasitism	III.	Cactus and moth
D.	Competition	IV.	Orchid and mango

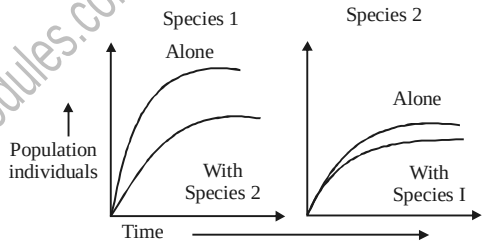
(a) A-III; B-IV; C-I; D-II
(b) A-IV; B-III; C-II; D-I
(c) A-I; B-III; C-II; D-IV
(d) A-III; B-IV; C-II; D-I

44. The density of a population in a given habitat during a given period, fluctuates due to changes in four basic processes On this basis choose the correct option to fill up A and B boxes in the given diagram.



(a) A = Natality + Immigration, B = Mortality + Emigration
(b) A = Natality + Mortality, B = Immigration + Emigration
(c) A = Birth rate + Death rate, B = Mortality + Emigration
(d) A = Natality + Emigration, B = Mortality + Immigration

45. In laboratory experiments, two species of the protist *Paramecium* were grown alone and in the presence of the other species. The following graphs show growth of species 1 (left) and species 2 (right), both along and when in mixed culture.



Interpretation of these graphs shows that
(a) competitive exclusion occurred in these experiments.
(b) both species are affected by interspecific competition but species 1 is less affected.
(c) both species are affected by interspecific competition but species 2 is less affected.
(d) both species are affected equally by interspecific competition.

RESPONSE GRID					
	37. ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ
	42. ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 35 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB36

SYLLABUS : Ecosystem

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Deep black soil is productive due to high proportion of
(a) sand and zinc (b) gravel and calcium
(c) clay and humus (d) silt and earthworm

2. Which one of the following statements is correct for secondary succession ?
(a) It begins on a bare rock
(b) It occurs on a deforested site
(c) It follows primary succession
(d) It is similar to primary succession except that it has a relatively fast pace

3. The zone of atmosphere that lies near the ground is
(a) troposphere (b) stratosphere
(c) homosphere (d) ionosphere

4. Food chain in which micro-organisms breakdown the food formed by primary producers is
(a) parasitic food chain (b) detritus food chain
(c) consumer food chain (d) predator food chain

5. Which of the following pairs is a sedimentary type of biogeochemical cycle?
(a) Oxygen and nitrogen
(b) Phosphorus and sulphur
(c) Phosphorus and nitrogen
(d) Phosphorus and carbon dioxide

6. Mass of living matter at a trophic level in an area at any time is called
(a) standing crop (b) detritus
(c) humus (d) standing state

7. If we completely remove the decomposers from an ecosystem, its functioning will be adversely affected because
(a) energy flow will be blocked
(b) herbivores will not receive solar energy
(c) mineral movement will be blocked
(d) rate of decomposition will be very high

8. Humus is essential for plant growth because:
(a) it is rich in nutrients and increases the water holding capacity of soil
(b) it increases aeration of soil
(c) it increases porocity of soil
(d) All of the above

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ		

Space for Rough Work

9. The rate at which light energy is converted to the chemical energy of organic molecules in the ecosystem is
(a) net primary productivity
(b) gross primary productivity
(c) net secondary productivity
(d) gross secondary productivity

10. An ecosystem which can be easily damaged but can recover after some time if damaging effect stops will be having
(a) low stability and high resilience
(b) high stability and low resilience
(c) low stability and low resilience
(d) high stability and high resilience

11. Both hydrarch and xerarch successions lead to:
(a) medium water conditions
(b) xeric conditions
(c) highly dry conditions
(d) excessive wet conditions

12. Which of the following ecosystems has highest rate of gross primary production?
(a) Grasslands
(b) Mangroves
(c) Coral reefs
(d) Equatorial rain forest

13. Largest amount of fresh water is found in
(a) lakes and streams
(b) underground
(c) polar ice caps and glaciers
(d) rivers

14. Which one of the following is not a function of an ecosystem?
(a) Energy flow (b) Decomposition
(c) Productivity (d) Stratification

15. Ecosystem is
(a) always open
(b) always closed
(c) both open and closed depending upon community
(d) both open and closed depending upon biomass

16. Transition zone between two vegetations is
(a) ecotone (b) ecotype
(c) ecocline (d) ecosystem

17. Which one of the following statement is correct?
(a) Warm and moist environment favour decomposition whereas low temperature and anaerobiosis inhibit decomposition
(b) Warm and moist environment inhibit decomposition whereas low temperature and anaerobiosis favour decomposition
(c) Warm and anaerobiosis favour decomposition as well as low temperature favours decomposition
(d) Warm and low temperature inhibit decomposition whereas anaerobiosis favours decomposition

18. _____ is the rate of production of organic matter by consumers.
(a) Primary productivity
(b) Secondary productivity
(c) Net primary productivity
(d) Gross primary productivity

19. Which of the following is not a characteristic of humus?
(a) It is rich in organic matter such as lignin and cellulose.
(b) It is collodial in nature and serves as a reservoir of nutrients.
(c) It is highly resistant to microbial action and undergoes slow decomposition.
(d) It is further degraded by the process of humification.

20. Percentage of photosynthetically active radiation (PAR) in the incident solar radiation is
(a) 1 - 5% (b) 2 - 10%
(c) less than 50 % (d) approx. 100%

21. Which one of the following animals may occupy more than one trophic levels in the same ecosystem at the same time?
(a) Sparrow (b) Lion
(c) Goat (d) Frog

22. In lithosere, foliose lichens make the conditions favourable for the growth of
(a) crustose lichens (b) mosses
(c) annual grasses (d) perennial grasses

23. Which one of the following is not one of the three aspects studied in biogeochemical cycling?
(a) The nature and size of natural reservoir
(b) The rate of movement between reservoirs
(c) How different biogeochemical cycles interact
(d) How new species create their own biogeochemical cycles

RESPONSE GRID					
	9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
	14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
	19. (a)(b)(c)(d)	**20.** (a)(b)(c)(d)	**21.** (a)(b)(c)(d)	**22.** (a)(b)(c)(d)	**23.** (a)(b)(c)(d)

Space for Rough Work

24. The largest ecosystem of the world is-
(a) Forests (b) Grasslands
(c) Great lakes (d) Oceans

25. Which of the following is a man made artificial ecosystem?
(a) Grassland ecosystem
(b) Agro ecosystem
(c) Ecosystem of artificial lakes and dams
(d) Forest ecosystem

26. What is the annual net primary productivity of whole biosphere?
(a) 170 billion tons (dry weight) of organic matter
(b) 165 billion tons (dry weight) of organic matter
(c) 160 billion tons (dry weight) of organic matter
(d) 155 billion tons (dry weight) of organic matter

27. Select the formula for ecological efficiency
(a) $\frac{\text{Gross primary productivity} \times 100}{\text{Incident total solar radiation}}$
(b) $\frac{\text{Food primary assimilated} \times 100}{\text{Food energy ingested}}$
(c) $\frac{\text{Net primary productivity} \times 100}{\text{Gross primary productivity}}$
(d) $\frac{\text{Energy in biomass production at a trophic level} \times 100}{\text{Energy in biomass production at previous trophic level}}$

28. Vegetation of a geographic region with low rainfall, high temperature, loose and sandy soil is of the type called:
(a) grassland (b) scrub forest
(c) xerophytic (d) evergreen tropical forest

29. Which one is nature's cleaner ?
(a) Consumers
(b) Producers
(c) Decomposers and scavengers
(d) Symbionts

30. Which one of the following statement is correct?
(a) Decomposition rate is slower if detritus is rich in lignin and chitin, and quicker, if detritus is rich in nitrogen and water - soluble substances like sugars.
(b) Decomposition rate is slower if detritus is rich in nitrogen and water - soluble substances like sugars, and quicker, if detritus is rich in lignin and chitin.
(c) Decomposition rate is slower if detritus is rich in cellulose, and quicker, if detritus is rich in phosphorus.
(d) Decomposition rate is quicker if detritus is rich in lignin, and quicker, if detritus is rich in sulphur.

31. What are the two most important climatic factors that regulate decomposition through their effects on soil microbes ?
(a) Temperature and rainfall
(b) Temperature and soil - moisture
(c) Temperature and humidity
(d) Temperature and pressure

32. Which of the following process helps in nutrient conservation?
(a) Mineralisation (b) Immobilisation
(c) Leaching (d) Nitrification

33. Bacteria and fungi in a forest ecosystem are generally
(a) Producers
(b) Decomposers
(c) Primary consumers
(d) Secondary consumers

34. Which one of the following is not a gaseous biogeochemical cycle in ecosystem ?
(a) Sulphur cycle (b) Phosphorus cycle
(c) Nitrogen cycle (d) Carbon cycle

35. In grass-deer-tiger food chain, grass biomass is one tonne. The tiger biomass shall be
(a) 100 kg (b) 10 kg
(c) 200 kg (d) 1 kg

36. The early settlers on a barren area (rock) are
(a) Ferns (b) Mosses
(c) Lichens (d) Diatoms

37. A community which starts succession in a habitat is
(a) Pioneer community (b) Seral community
(c) Biotic community (d) Ecosere

38. Last stabilised community in a plant succession is known as
(a) Seral community (b) Pioneer community
(c) Ecosere (d) Climax community

39. Identification and enumeration of plant and animal species of an ecosystem gives its
(a) productivity (b) stratification
(c) species composition (d) all of these

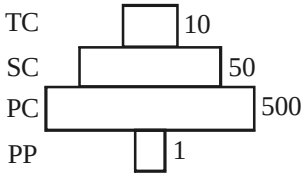
RESPONSE GRID					
	24. ⓐⓑⓒⓓ	**25.** ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ
	29. ⓐⓑⓒⓓ	**30.** ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ
	34. ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ
	39. ⓐⓑⓒⓓ				

Space for Rough Work

40. Which of the following factors influence communities ?
(i) Climate
(ii) Species interaction
(iii) Feeding relationships among organisms
(iv) Succession
(a) (i) and (iii) (b) (i) and (iv)
(c) (i), (ii) and (iii) (d) All of these

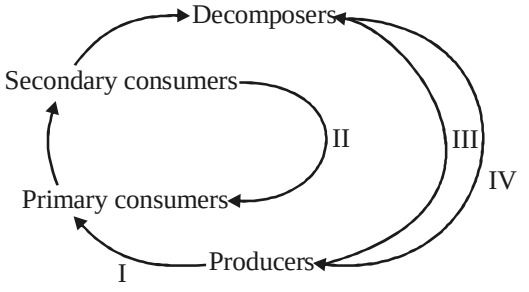
41. Grasslands can support greater grazing rates by herbivores than forests because
(a) net production of grassland is greater.
(b) more of the grassland is above the ground.
(c) grasslands receive more sunlight.
(d) grasslands produce less woody plant tissue.

42. Given below is an imaginary pyramid of numbers. What could be one of the possibilities about certain organisms at some of the different levels ?



(a) Level PC is "insects" and level SC is "small insectivorous birds".
(b) Level PP is "phytoplanktons" in sea and "whale" is on top level TC.
(c) Level PP is "peepal trees" and the level SC is "sheep".
(d) Level PC is "rats" and level SC is "cats".

43. The given diagram shows (I, II, III, and IV) the flow of materials between different trophic levels. Which arrow is incorrect?



(a) I (b) II
(c) III (d) IV

44. Match the following and choose the correct option.

	Column - I		Column - II
A.	Presence of 3-4 storey of plants grown in a forest	I.	Blue-green algae
B.	A biome having grasses with scattered trees	II.	Stratification
C.	Man made ecosystem	III.	Savannah
D.	Pioneer in hydrosere	IV.	Dam

(a) A – III; B – II; C – IV; D – I
(b) A – III; B – I; C – IV; D – II
(c) A – I; B – III; C – II; D – IV
(d) A – II; B – III; C – IV; D – I

45. The correct order of the process of decomposition is
(a) Catabolism → Fragmentation → Leaching → Humification → Mineralization
(b) Catabolism → Fragmentation → Humification → Leaching → Mineralization
(c) Fragmentation → Humification → Catabolism → Leaching → Mineralization
(d) Fragmentation → Leaching → Catabolism → Humification → Mineralization

RESPONSE GRID	40. ⓐⓑⓒⓓ 41. ⓐⓑⓒⓓ 42. ⓐⓑⓒⓓ 43. ⓐⓑⓒⓓ 44. ⓐⓑⓒⓓ 45. ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 36 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	50	Qualifying Score	70
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY

CB37

SYLLABUS : Biodiversity and its conservation

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which one of the following is not included under *in-situ* conservation ?
(a) Botanical garden
(b) Biosphere reserve
(c) National park
(d) Sanctuary

2. Biodiversity Act of India was passed by the parliament in the year
(a) 1992 (b) 1996
(c) 2000 (d) 2002

3. Biodiversity of a geographical region represents
(a) endangered species found in the region.
(b) the diversity in the organisms living in the region.
(c) genetic diversity present in the dominant species of the region.
(d) species endemic to the region.

4. Which animal has become extinct from India?
(a) Snow Leopard (b) Hippopotamus
(c) Wolf (d) Cheetah

5. Which of the following is considered a hot-spot of biodiversity in India ?
(a) Indo-Gangetic Plain (b) Eastern Ghats
(c) Aravalli Hills (d) Western Ghats

6. Which group of vertebrates comprises the highest number of endangered species ?
(a) Birds (b) Mammals
(c) Fishes (d) Reptiles

7. One of endangered species of Indian medicinal plants is that of
(a) *Ocimum* (b) Garlic
(c) *Nepenthes* (d) *Podophyllum*

8. Which one of the following is the correct matched pair of an endangered animal and National Park ?
(a) Rhinoceros - Kaziranga National Park
(b) Wild Ass - Dudhwa National Park
(c) Great Indian Bustard - Keoladeo National Park
(d) Lion - Corbett National Park

RESPONSE GRID					
1. (a)(b)(c)(d)	**2.** (a)(b)(c)(d)	**3.** (a)(b)(c)(d)	**4.** (a)(b)(c)(d)	**5.** (a)(b)(c)(d)
6. (a)(b)(c)(d)	**7.** (a)(b)(c)(d)	**8.** (a)(b)(c)(d)		

Space for Rough Work

9. The area where wild populations, traditional life styles and genetic resources are protected is :
(a) Core Zone
(b) Buffer Zone
(c) Biosphere reserve
(d) Manipulation Zone

10. Which one of the following species of plant is considered as the world's most problematic aquatic weed?
(a) *Lantana*
(b) *Eichhornia*
(c) *Parthenium* (carrot grass)
(d) Brown algae

11. Which one of the following is not observed in biodiversity hotspots ?
(a) Endemism
(b) Accelerated species loss
(c) Lesser inter-specific competition
(d) Species richness

12. Which one of the following shows maximum genetic diversity in India ?
(a) Groundnut (b) Rice
(c) Maize (d) Mango

13. Study the four statements (i–iv) given below and select the two correct ones out of them:
(i) A lion eating a deer and a sparrow feeding on grain are ecologically similar in being consumers
(ii) Predator star fish *Pisaster* helps in maintaining species diversity of some invertebrates
(iii) Predators ultimately lead to the extinction of prey species
(iv) Production of chemicals such as nicotine, strychnine by the plants are metabolic disorders
The two correct statements are:
(a) (ii) and (iii) (b) (iii) and (iv)
(c) (i) and (iv) (d) (i) and (ii)

14. Reason of diversity in living beings is due to
(a) mutation
(b) long term evolutionary change
(c) gradual change
(d) short term evolutionary change

15. Which of the following is a reason for the greater biological diversity of tropical regions?
(a) Tropical latitudes have remained almost undisturbed for millions of years.
(b) Tropical environments are less seasonal, relatively more constant and predictable.
(c) More solar energy is available in the tropics resulting inhigh productivity.
(d) All of these.

16. An exotic species that is introduced to a new area, spreads rapidly and eliminates native species is called
(a) immigrant species
(b) invasive species
(c) *Eicchornia crasspies*
(d) all of these

17. Characters of stable community are
(a) it should not show too much variations in year-to-year productivity.
(b) it must be resistant to occasional natural or man-made disturbances.
(d) it should be resistant to invasions by alien species.
(d) All of these

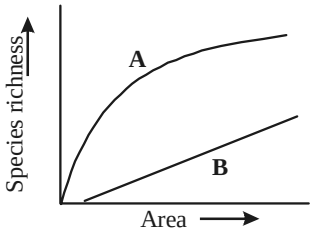
18. What is the decreasing order of numbr of animals species as far as India is concerned?
(a) Mammals, Aves, Reptiles, Amphibians
(b) Aves, Reptiles, Mammals, Amphibians
(c) Mammals, Reptiles, Amphibians, Aves
(d) Reptiles, Amphibians, Mammals, Aves

19. Organization responsible for maintaning Red Data Book is
(a) IUCN (b) WWF
(c) CITES (d) IBWL

RESPONSE GRID					
	9. (a)(b)(c)(d)	**10.** (a)(b)(c)(d)	**11.** (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)
	14. (a)(b)(c)(d)	**15.** (a)(b)(c)(d)	**16.** (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)
	19. (a)(b)(c)(d)				

Space for Rough Work

20. Which option correctly describes are equations for curves A and B, in the given graph of species - area relationhip?



	A	B
(a)	$S = CA^z$	Log S = Log C + Z Log A
(b)	Log S = Log C + Z Log A	$S = CA^z$
(c)	Log C = Log S + Z log A	$S = CA^z$
(d)	$S = CA^z$	Log C = Log S + Z Log A

21. Genetic variations affect the productionof the drug reserpine in the medicinal plant *Rauwolfia vomitoria* growing in different Himalayan ranges. What kind of diversity does it indicate?
(a) Species diversity
(b) Genetic diversity
(c) Ecological diversity
(d) None of these

22. Keystone species deserve protection because these
(a) are capable of surviving in hash environmental conditions
(b) indicate the presence of certain minerals in the soil
(c) have become rare due to overexploitation
(d) play an important role in supporting other species.

23. In a National Park, protection is provided to
(a) flora and fauna (b) entire ecosystem
(c) fauna only (d) flora only

24. Which of thse organisms are protected by people of 'Bishnoi' community of Rajasthan?
(a) *Prosopis cineraria* (b) Black buck
(c) Bhojpatra (d) Both (a) and (b).

25. Which o the following statements regarding biodiversity hot spots are incorrect?
(i) High endemism
(ii) High levels of species richness.
(iii) Total number is 34 in the world.
(iv) Five of these occur in India.
(v) High alien species invasions.
(vi) Cover less than 2% of the earth's land area; but if properly conserved, they can reduce extinctions by about 30%.
(a) (i), (ii), (iii) (b) (i), (ii), (iii), (iv)
(c) (iv), (v), (vi) (d) (i), (ii), (iv)

26. Ex situ conservation is used for the conservation of
(a) all plants
(b) all animals
(c) threatened animals and plants
(d) both (a) and (b).

27. _____ National Park was the first National Park of India.
(a) Jim Corbett (b) Nanda Devi
(c) Kaziranga (d) Jaldapara

28. First 'Earth Summit' for 'Convention on Biological Diversity' (CBD) was held at
(a) Johannesberg (2002), S. Africa
(b) Rio de Janeiro (1992' Brazil
(c) Dehradun (1992), India
(d) New York (2000), U.S.A.

29. *Antilopa carvicapra*/Black Buck is –
(a) Vulnerable (b) Endangered
(c) Critically endangered (d) Extinct in the wild

30. Alpha diversity is present –
(a) Within community (b) Between community
(c) Ranges of communities (d) All of the above

31. Biodiversity is determined by –
(a) Number of individuals in an area
(b) Species richness
(c) Evenness
(d) Both (b) and (c)

RESPONSE GRID					
	20. (a)(b)(c)(d)	**21.** (a)(b)(c)(d)	**22.** (a)(b)(c)(d)	**23.** (a)(b)(c)(d)	**24.** (a)(b)(c)(d)
	25. (a)(b)(c)(d)	**26.** (a)(b)(c)(d)	**27.** (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)
	30. (a)(b)(c)(d)	**31.** (a)(b)(c)(d)			

Space for Rough Work

32. Which of the following species is endangered ?
(a) *Panthera leo perrica* (b) *Pythan molurus*
(c) *Chelonia mydas* (d) *Pallas siberian crane*

33. Decrease in species diversity in tropical countries is mainly due to –
(a) Urbanisation (b) Pollution
(c) Deforestation (d) Soil erosion

34. Which of the following animal has become almost extinct in India ?
(a) Wolf (b) Rhinoceros
(c) Hippopotamus (d) Cheetah

35. Those species whose populations have been seriously depleted and whose ultimate security is not assured are known as –
(a) Threatened species (b) Endangered species
(c) Vulnerable species (d) Rare species

36. Which of the following is threatened by illegal trade in wildlife products?
(a) Nile perch (b) Elephants
(c) Key deer (d) Galapagos tortoises

37. Humans have altered _____ of Earth's land surface.
(a) very little (b) about 25%
(c) about 50% (d) about 80%

38. Which endangered animal is the source of world's finest, lightest, warmest and most expensive wool-the shahtoosh ?
(a) Nilgai (b) Cheetal
(c) Kashmiri Goat (d) Chiru

39. Which of the following is the most serious threat to biodiversity?
(a) Competition from exotic species
(b) Commercial harvesting
(c) Habitat destruction
(d) Overexploitation

40. Diversity in the type of breaks of finches adapted to different feeding habits on the Galapagos Islands, as observed by Darwin, provides evidence for
(a) intraspecific variations.
(b) intraspecific competition.
(c) interspecific competition.
(d) origin of species by natural selection.

41. Which of the following is not a step in understanding biodiversity ?
(a) Naming the species
(b) Looking at other related species
(c) Assessing the species geographic range
(d) Quantifying the species genome

42. Diversity of habitat over the total landscape is called
(a) β diversity (b) γ diveristy (gamma)
(c) landscape diversity (d) ecosystem diversity

43. The term hot spot for high diversity ecological regions was coined by –
(a) IUCN (b) Myers
(c) Odum (d) Kormandy

44. Following arrangement is correct from the point of view of decreasing biodiversity in angiosperms (N), fungi (F), pteridophytes (P) and algae(A)
(a) N > F > P > A (b) N > F > A > P
(c) F > N > P > A (d) F > N > A > P

45. The number of plant species recorded from India, is
(a) 30,000 (b) 45,000
(c) 70,000 (d) 90,000

RESPONSE GRID					
	32. ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ
	37. ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ
	42. ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 37 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	50	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB38

SYLLABUS : Environmental issues

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Acid rains are produced by
(a) excess emissions of NO_2 and SO_2 from burning fossil fuels
(b) excess production of NH_3 by industry and coal gas
(c) excess release of carbon monoxide by incomplete combustion
(d) excess formation of CO_2 by combustion and animal respiration

2. DDT residues are rapidly passed through food chain causing biomagnification because DDT is
(a) moderately toxic
(b) non-toxic to aquatic animals
(c) water soluble
(d) lipo soluble

3. Which of these is a pollution related to occupational health hazard disease ?
(a) Pneumoconiosis (b) Asthma
(c) Flurosis (d) Silicosis

4. Secondary sewage treatment is mainly a
(a) physical process (b) mechanical process
(c) chemical process (d) biological process

5. Biochemical Oxygen Demand *(BOD)* in a river water
(a) has no relationship with concentration of oxygen in the water.
(b) gives a measure of *Salmonella* in the water.
(c) increases when sewage gets mixed with river water.
(d) remains unchanged when algal bloom occurs.

6. Today, concentration of green house gases is high because of
(a) Use of refrigerator
(b) Increased combustion of oil and coal
(c) Deforestation
(d) All the above

7. The electrostatic precipitator is used for removing particulate matter from
(a) Exhaust of the thermal power plant
(b) Exhaust from the automobiles
(c) Industrial effluents
(d) Kitchen waste

RESPONSE GRID					
1. ⓐⓑⓒⓓ	**2.** ⓐⓑⓒⓓ	**3.** ⓐⓑⓒⓓ	**4.** ⓐⓑⓒⓓ	**5.** ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ			

Space for Rough Work

8. Photochemical smog formed in congested metropolitan cities mainly consists of
(a) Ozone, peroxyacetyl nitrate and NOX
(b) Smoke, peroxyacetyl nitrate and SO_2
(c) Hydrocarbons, SO_2 and CO_2
(d) Hydrocarbon, ozone and SOX

9. Ozone hole means
(a) hole in the ozone layer in stratosphere.
(b) decrease in the thickness of ozone in the stratosphere.
(c) decrease in concentration of ozone in trophosphere.
(d) increase in the concentration of ozone in trophosphere.

10. A lake near a village suffered heavy mortality of fishes within a few days. Consider the following reasons for this.
(i) Lots of urea and phosphate fertilizer were used in the crops in the vicinity
(ii) The area was sprayed with DDT by an aircraft
(iii) The lake water turned green and stinky
(iv) Phytoplankton populations in the lake declined initially thereby greatly reducing photosynthesis.
(a) (i) and (iii) (b) (i), (ii) and (iv)
(c) (iii) and (iv) (d) (ii), (iii) and (iv)

11. Wildlife is destroyed most when
(a) there is lack of proper care
(b) mass scale hunting for foreign trade
(c) its natural habitat is destroyed
(d) natural calamity occurs

12. The 'Earth Summit' held at Rio de Janerio in 1992 resulted into
(a) Compilation of Red list
(b) Establishment of Biosphere Reserves
(c) Convention on Biodiversity
(d) Development of Hot Spots of Biodiversity

13. Which one of the following expanded forms of the following acronyms is correct?
(a) IPCC = International Panel for Climate Change
(b) UNEP = United Nations Environmental Policy
(c) EPA = Environmental Pollution Agency
(d) IUCN = International Union for Conservation of Nature and Natural Resources

14. Photochemical smog pollution does not contain
(a) Nitrogen dioxide
(b) Carbon dioxide
(c) PAN (peroxy acetyl nitrate)
(d) Ozone

15. When huge amount of sewage is dumped into a river, its B.O.D. will
(a) increase (b) decrease
(c) sharply decrease (d) remain unchanged

16. Which of the following statements is correct?
(a) Primary pollutants are more harmful than secondary pollutants.
(b) Primary pollutants and secondary pollutants are equally harmful.
(c) Secondary pollutants are more harmful than primary pollutants.
(d) DDT is a secondary pollutant

17. Which one of the following statements is incorrect regarding Bhopal gas tragedy?
(a) Methyl isocyanate gas leakage took place
(b) Thousands of human beings died
(c) Radioactive fall out engulfed Bhopal
(d) It took place in the night of December 2/3, 1984

18. Lichens are the indicators of
(a) water pollution
(b) air pollution
(c) soil pollution
(d) all of these.

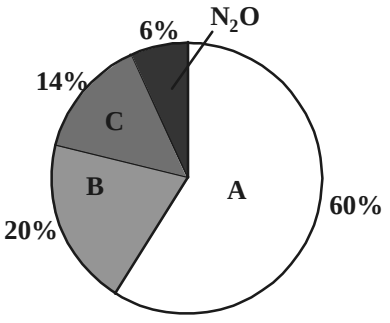
19. Noise pollution may cause nervousness and irritability by stimulating the secretion of
(a) thyroid hormone
(b) adernaline hormone
(c) parathyroid hormone
(d) none of these

20. Atmospheric pollutant is –
(a) 0.0034% CO_2 (b) 0.034% CO_2
(c) 0.34% CO_2 (d) 3.4% CO_2

RESPONSE GRID					
	8. ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ
	13. ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ
	18. ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ		

Space for Rough Work

21. Given pie-diagram represents the relative contribution of various GHGz to total global warming. Select the correct statement(s) regarding A, B and C.



(a) A is the gas which is produced during the combustion of fossil fuels.
(b) B are the chemicals which are used as coolants in refrigerators
(c) C is the gas which is the major constituent of biogas
(d) All of these

22. Which of the following can cause DNA damage and mutations in humans?
(a) Absorption of UV-A and UV-B
(b) Absorption of UV-B
(c) Absorption of UV-A
(d) Absorption of UV-A and UV-C

23. Which of the following statements is not correct regarding jhum cultivation?
(a) It is also called as shifting cultivation and has resulted in deforestation
(b) It helps in increasing crop yield to a considerable extent.
(c) A time-gap of several years is required for the recovery of the land after cultivation.
(d) It involves cutting down of trees of the forest, burning of the plant remains and then using the land for farming.

24. Which of the following statement is incorrect ?
(a) Carbon monoxide is the major environment pollutant
(b) All pollutants are not waste
(c) Nitrogen and magnesium can pollute water
(d) Lichens are affected by sulphur

25. Noise pollution is created if noise is in excess to –
(a) 70-75 dB (b) 50-60 dB
(c) 80-99 dB (d) 40-65 dB

26. Which of the following does not cause pollution ?
(a) Thermal power project (b) Steel power plant
(c) Automobiles (d) Hydro electric project

27. Eutrophication causes reduction in
(a) dissolved CO_2 (b) dissolved O_2
(c) dissolved nutrients (d) none of the above

28. It is said, the Taj Mahal may be destroyed due to
(a) Flood in Yamuna river
(b) Decomposition of marble as a result of high temperature
(c) Air pollutants released from oil refinery of Mathura
(d) All of the above

29. The scrubber is used mainly to remove the following gas/es from the exhaust after spraying water/ lime
(a) CO_2 (b) SO_2
(c) O_2 & N_2 (d) CO & CO_2

30. Volcano is _____ source of pollution.
(a) artificial (b) natural
(c) Both (a) and (b) (d) man-made

31. Montreal Protocol was called to check emission of
(a) e-wastes (b) UV radiation
(c) CFCs (d) All of these

32. Which of the following is normally not an atmosphere pollutant ?
(a) CO_2 (b) SO_2
(c) Hydrogen (d) CO

33. Which of the following is not properly matched
(a) Formaldehyde - carcinogenic
(b) Sulphur dioxide - respiratory problems
(c) Nitrogen oxide - brown air
(d) Mean annual temperature - 25° C

34. Cleaning Environment with biological options such as microbes and plants is called
(a) Bioremediation (b) Biotechnology
(c) Biowarfare (d) Incineration

35. The 'Jhum cultivation' in India is practiced in
(a) North- East states (b) South–West coast
(c) South- East coast (d) Gangetic plain

36. Why is the concentration of ozone is less over the north and south poles ?
(a) CFCs accumulate only in area where the air is cold
(b) CFC use is highest in these areas
(c) CFCs stick to frozen water vapour and are able to act catalysts
(d) UV rays are stronger in the atmosphere

RESPONSE GRID

21. (a)(b)(c)(d)	**22.** (a)(b)(c)(d)	**23.** (a)(b)(c)(d)	**24.** (a)(b)(c)(d)	**25.** (a)(b)(c)(d)
26. (a)(b)(c)(d)	**27.** (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)	**30.** (a)(b)(c)(d)
31. (a)(b)(c)(d)	**32.** (a)(b)(c)(d)	**33.** (a)(b)(c)(d)	**34.** (a)(b)(c)(d)	**35.** (a)(b)(c)(d)
36. (a)(b)(c)(d)				

Space for Rough Work

37. The waste water from Industries may contain toxic heavy metals having density of more than
(a) 5 g / cm^3 (b) 10 g /cm^3
(c) 2 g /cm^3 (d) 15 g /cm^3

38. DDT causes egg shell thinning in birds because it inhibits
(a) calmodulin (b) calcium ATPase
(c) magnesium ATPase (d) carbonic anhydrase

39. FOAM (Friends of the Arcata Marsh) is a group of citizens responsible for the integrated process of
(a) reducing eutrophication
(b) sewage and water treatment
(c) radio- active waste treatment
(d) minimizing global warming

40. Without Green house effect the average temperature of earth surface would have been
(a) 18 °C (b) 8°C
(c) – 8°C (d) –18°C

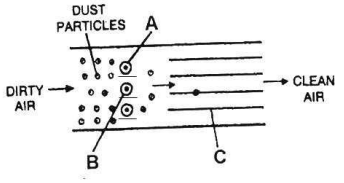
41. Read the following statements.
A lake near a village suffered heavy mortality of fishes within a few days. Consider the following reasons for this;
(i) Lots of urea and phosphate fertilizer were used in the crops in the vicinity.
(ii) The area was sprayed with DDT by an aircraft.
(iii) The lake water turned green and stinky.
(iv) Phytoplankton populations in the lake declined intially thereby greatly reducing photosynthesis.
Which two of the above were the main causes of fish mortality in the lake ?
(a) (i) and (iii) (b) (i) and (ii)
(c) (ii) and (iii) (d) (iii) and (iv)

42. Match column-I with column-II and select the correct option.

Column-I		Column-II	
A.	Catalytic converter	I.	Particulate matter
B.	Electrostatic precipitator	II.	Carbon monoxide and nitrogen oxides
C.	Earmuffs	III.	High noise level
D.	Land fills	IV.	Solid wastes

(a) A-I; B-II; C-III; D-IV
(b) A-II; B-I; C-III; D-IV
(c) A-IV; B-III; C-II; D-I
(d) A-III; B-II; C-IV; D-I

43. The given diagram shows electrostatic precipitator. Identify A, B and C.



(a) A - Discharge corona, B - Negatively charged wire, C - Collection plate grounded
(b) A - Discharge corona, B - Positively charged wire, C - Collection plate grounded
(c) A - Discharge corona, B - Negatively charged wire, C - Collection plate burnt
(d) A - Uncharge corona, B - Positively charged wire, C - Collection plate never grounded

44. Which of the following statements is/are correct about 'Eco San' toilets?
(a) It is a sustainable system for handling human excreta or faecal matter by using dry 'composting toilets'.
(b) These are very useful for the rural areas where sewer systems are not possible.
(c) These toilets are hygienic, efficient, practical & most effective for the disposal of human waste.
(d) All of the above

45. Algal blooms impart a distinct colour to water due to
(a) their pigments.
(b) excretion of coloured substances.
(c) formation of coloured chemicals in water facilitated by physiological degradation of algae.
(d) absorption of light by algal cell wall.

RESPONSE GRID					
	37. ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ
	42. ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ	

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 38 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

HINTS & SOLUTIONS

DPP /CB01

1. (b) There are several factors and processes which differentiate living beings with non-living beings like reproduction, respiration, growth, etc. But among them reproduction is the only characteristic which differentiates without any exception, living being from non-living beings.

2. (a) *Panthera tigris* is the scientific name of tiger.

3. (a) **4. (b)** **5. (c)**

6. (a) The common characteristics between brinjal and wheat can be observed maximum at the level of their division.

7. (c) Cytotaxonomy is the study of chromosome number, size and behaviour.

8. (b) The original scientific names were taken from Latin and Greek languages. New names are now derived either from Latin language or are latinised. This is because Latin language is dead and therefore, it will not change in the form or spellings with the passage of time.

9. (d)

10. (b) The number of similar characters of categories decreases from lowest rank to highest rank in a taxonomic hierarchy. Out of the given categories i.e., family, class, genus and species, the class being the highest category possesses the least similar characters.

11. (c) Hierarchy of categories is the classification of organisms in a definite sequence of categories (taxonomic categories) in a descending order starting from kingdom and reaching upto species or an ascending order from species to kingdom. The number of similar characters of categories decreases from lowest rank (species) to highest rank (kingdom). The taxonomic hierarchy includes seven obligate categories-kingdom, division or phylum, class, order, family, genus and species. Some subcategories like tribe, subfamily, subspecies are also used whenever required.

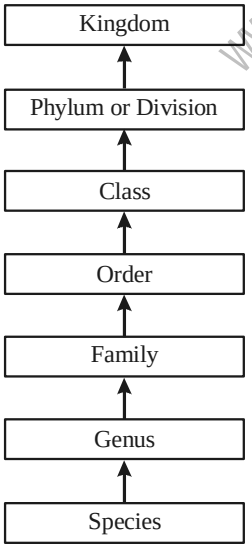


Fig: Taxonomical hierarchy showing arrangement in ascending order

12. (c) Teleology is the unscientific explanation of phenomena, while study of vestigeal organs is known as dysteleology.

13. (d) International code for Zoological Nomenclature is responsible for setting rules for naming of animals and resolution of nomenclature problems.

14. (b) When external temperature is warm, the superficial blood vessels dilate to lose the body heat.

15. (c) The biological species concept was formulated by Theodosium Dobzhansky and Ernst Mayr. According to this concept "A species is a reproductive community of populations whose members can interbreed with each other but not with the members of other species.

16. (b) Carolus Von Linnaeus in his book Genera Plantanum made use of the artificial system of classification. He distinguished between the natural and artificial systems. He used the binomial nomenclature system and classified organisms into genius and species.

17. (a) Species is the lowest taxonomic category. Class is a category made of one or more related orders possessing similar correlated characters, Family is composed of one to many related genera. Division comprises of several related classes.

18. (d) Taxon is a grouping of organisms of any level in hierarchy of classification based on some common characteristic.

19. (c) Species is the lowest or basic taxonomic category comprising of one or more natural population of individuals that interbreed freely.

20. (b) Carolus Linnaeus system of classification is artificial.

21. (a) Carolus Von Linnaeus wrote the book systema Naturae.

22. (d) Benthem and Hooker system was published well before there were internationally accepted rules for botanical nomenclature. In this system, terminology for families was not so as it is now.

23. (c) Individuals of the same species can interbreed. No two individuals share the same ecological niche.

24. (d) Biosystematics is the study of diversity of organism and all their comparative and evolutionary relationships.

25. (b) Trinomial nomenclature of gorilla is *Gorilla gorilla gorilla.*

26. (a) Isotype refers to the duplicate of holotype. When the original material is missing, the new nomenclatural type is termed as neotype. When there is no holotype, any of two or more specimens cited by the author is named as syntype.

27. (c) Carnivora and Insectivora are two orders of mammals. Mastigophora is a class of Protozoa. Any plant-eating animal can be termed as a herbivore.

28. (c) Many related families can be grouped under an order.

29. (d) NBRI is a research institute situated in Lucknow that is engaged in the field of taxonomy and Modern biology.

30. (c) Holotype- a specimen on which the original description of the species is based.
Syntype- any of two or more specimens cited by author when there is no holotype.
Neotype- a specimen designated when the original types are known to have been destroyed.
Paratype- a specimen other than the holotype available with the author.
Isotype- a duplicate of the type.

31. (a) Chemotaxonomy is the method of biological classifi cation based on similarities in the structure of certain compounds among the organisms being classified.

32. (b) Tautonym is the name in which both genus and species epithet are identical

33. (c) Lectotype is a specimen later selected to serve as the single type specimen for species originally described from a set of syntypes.

34. (d) Neotype is a type specimen that is selected subsequent to the description of a species to replace a pre-existing type that has been cost or destroyed.
35. (a) Dried specimens are poisoned not by DDT but by others like formaldehyds.
36. (a) Reproduction is a characteristic feature of all living organisms.
37. (b) Animals in lower hierarchy possess more characters in common.
38. (c) Phylum, class and family are classificatory units.
39. (c) Homonym is a name for a taxon that is identical in spelling to another such name, that belongs to a different taxon.
40. (a) Autonyms are automatically created names as regulated by the International code of Nomenclature for algae, fungi, and plants.
41. (d) A binomial name in which the specific name repeats the generic.
42. (b) The most important process for formation of new species is reproductive isolation as this prevents interbreeding in between members of a population, thus giving rise to new species.
43. (c) Two or more species which are reproductively isolated from each other but are morphologically quite similar are known as sibling species. Sympatric species are developed due to reproductive isolation and occur in over lapping or same area of geographical distribution. Parapatric species are developed in adjacent geographical areas meeting in very narrow regions of overlap.
44. (b) Members of same species form population and members of different species form community.
45. (d) Exobiology is the study of possible extra-terrestrial life.

DPP /CB02

1. (b) **2. (d)**
3. (c) Cyanobacteria, chlorophyll a, PS I and II.
4. (d)
5. (c) Vegetative phase-animal-like and reproductive phase- plant-like.
6. (c) Desmids i.e golden algae belongs to group chrysophytes. These are found in freshwater as well as marine environment.
7. (a)
8. (c) T_2 phage consists of linear ds DNA.
9. (b) Cell wall is absent in Mycoplasma.
10. (d) Non-motile spores, saprophytic protists.
11. (c) Eubacteria can be differentiated from archaebacteria and bacteria on the basis of cell wall. Eubacteria possess true cell wall, made up of NAM and NAG i.e. N-acetyl muramic acid and N-acetyl glucoseamine. Cell wall of archaebacteria is made up of N-acetyl talosaminuric acid.
12. (d) Pathogen of cholera is *Vibrio cholerae* bacterium. Cholera is transmitted by contaminated water. Typhoid or enteric fever spreads through contaminated water in which bacterium *Salmonella typhi* is present. Citrus canker and crown gall are bacterial disease of plants caused by *Xanthomonas citri* and *Agrobacterium tumefaciens* respectively.
13. (a) Cyanobacteria or blue-green algae are Gram + photosynthetic prokaryotes which perform oxygenic photosynthesis. Photosynthetic pigments include chlorophyll *a*, carotenoids and phycobilins. Cyanobacteria are classified under kingdom Monera. Cyanobacterial cell structure is typically prokaryotic – one envelope organisation with peptidogolycan wall, naked DNA, 70S ribosomes and absence of membrane bound structure like endoplasmic reticulum, mitochondria, golgi bodies, plastids, lysosomes, sap vacuoles. The outer part of the protoplast, called chromoplasm, contains a number of photosynthetic thylakoids.
14. (d) Saprophytic bacteria are free living bacteria which obtain their food from organic remains, plant and animal origin. Aerobic breakdown of organic compounds is known as decay. In nature saprophytic bacteria alongwith saprotrophic fungi are the decomposers of organic remains.
15. (a) Diatoms are very important photosynthesizers. About half of all the organic matter synthesized in the world is believed to be produced by them. Diatoms are probably the most numerous of all plants like protists. Because of this abundance, they are one of the most important primary producers of the sea. There are about 5,500 species of diatoms, mainly marine. The diatoms constitute an important phytoplankton component of the oceans.
16. (c) Fungi is a large kingdom of over 100,000 species. They are achlorophyllous, heterotrophic, spore-forming, non-vascular, eukaryotic organisms which often contain chitin or fungal cellulose in their walls and possess glycogen as food reserve. They are cosmopolitan in occurrence being present in air, water, soil, over and inside animals and plants.
17. (d) Virus is an obligate parasite and is inert outside the host cell. An inert virus outside host is called virion.
18. (d) Monera is the kingdom of all prokaryotes and includes bacteria, blue green algae (cyanobacteria) and archae- bacteria- a group of ancient bacteria kingdom. Protista includes slime unicellular and colonial eukaryotes. The important members are diatoms, dinoflagellates, euglenoids, alone moulds and protozoans. Fungi the kingdom of multicellular or multinucleate heterophyllous and spore producing eukaryotic organisms like *Rhizopus* mildews, mushroom etc. Kingdom plantae includes all coloured multicellular photosynthetic organisms (plants).
19. (c) Viruses that get integrated with the bacterial host genome are called Lysogenic. Lysozymes are present in the saliva and are antibacterial agents. Lipolytic enzymes are the enzymes which catalyse breakdown (lysis) of fats (Lipids).
20. (a) Phenetic classification is purely based on appearances. Phylogenetic classifiaction is based on ancestral lineage. Karyotaxonomy is based on DNA characteristics. Morphotaxonomy involves morphological characters.
21. (d) Biological classification is the scientific arrangement of organisms in a hierarchical series of groups and subgroups on the basis of similarities and differences in their traits. It helps in building evolutionary pathways and in identifying new organisms.
22. (c) Artificial system of classification is based on comparison of on or a few characters. Phylogenetic system of classification indicates the evolutionary or phylogenetic relationship of organisms.
23. (b) The five kingdom classification is a mode of classification based on the following criteria.
– Complexity of cell structure
– Complexity of body structure
– Modes of nutrition
– Ecological life styles
– Phylogenetic relationship
24. (c) Phylogenetic system of classification is a system indicating the evolutionary or phylogenetic relationship of organisms.
25. (a) Bacteria are prokaryotes which are grouped under Monera. Protista is a kingdom of unicellular eukaryotes. Fungi is a kingdom of multicellular spore-producing eukaryotes. Plantae are photosynthetic eukaryotes.
26. (a) Retroviruses have RNA as the genetic material and hence they exhibit reverse transcription whereby DNA is synthesized on RNA template. They have reverse transcriptase as the enzyme.

27. (b) Four criteria are : (i) complexity of cell, (ii) complexity of organism, (iii) mode of nutrition and (iv) major ecological role

28. (b) First phylogenetic classification was given by Eichler but that was partially phylogenetic and first true phylogenetic classification was given by Engler and Prantl.

29. (a) *Taenia*, commonly known as tapewom is not a protist, it belongs to phylum Platyhelminthes (Kingdom Animalia)

30. (c)

31. (b) Physiological characters

32. (c) During the origin of life, the first organisms evolved were chemoheterotrophs. They obtained the organic material from outside which they utilized in energy production and synthesis of their own organic material.

33. (d) Bacteria posses various forms and shapes and are of 4 different types - coccus (round), bacillus (rod shaped), vibrio (comma shaped) and spirillum (spiral like cork screw).

34. (c) Slime moulds in the division of myxomycota have spores that develop into flagellated gametes.

35. (b) While working at the Rockefeller Institute, Brown reported isolation of a PPLO from human arthritic joint tissue in 1938. In discussing the significance of this observation, Brown reported successful treatment of arthritic patients in 1949 with a new antibiotic called aureomycin.

36. (c)

37. (c) *Saccharomyces cervisiae* is a yeast used in making bread (Baker's yeast) and commercial production of ethanol.
Paramecium & *Plasmodium* are of animal kingdom while *Pencillium* is a fungi. Lichen is composite organism formed from the symbiotic association of an algae and a fungus. *Nostoc* & *Anabaena* are examples of kingdom monera.

38. (a) **39. (a)** **40. (b)** **41. (b)** **42. (a)**

43. (a)

44. (b) The correct labeling in the figures of bacterial cell and *Nostoc* are - A- cell wall, B - cell membranes, C - DNA, D- heterocysts, E - mucilaginous sheath.

45. (a) A - Cocci (spherical), B - Bacilli (rod shaped), C - Spirilla (spiral), D - Vibrio (comma shaped). These are all the shapes of the bacteria.

DPP /CB03

1. (b) Reserve food in red algae (Rhodophyceae) is floridean starch. In green algae (Chlorophyceae), reserve food is starch. In brown algae Phaeophyceae, reserve food is laminarin and mannitol. In Cyanophyceae, reserve food is cyanophycean starch.

2. (a) Peat moss is another name for *Sphagnum*. It is also known as famine food in China.

3. (b) Well developed vascular system is present in the members of pteridophytes but absent in mosses as the plant body is sporophyte which is distinguished into true root, stem and leaves.

4. (c) The leaves appear green because of the pigment chlorophyll which does not absorb green light rather reflects it back.

5. (b) In chlorophyceae, sexual reproduction takes place by all the three processes :
Isogamy – fusion of morphologically and physiologically similar gametes. Anisogamy – morphologically similar but physiologically dissimilar gametes. Oogamy – fusing gametes are dissimilar in all respect.

6. (d) *Azolla* has been used as a green manure crop in Vietnam and China for centuries. The ability of *Azolla* to shade out weeds in wetland rice and taro has been noted by farmers and researchers since the early 20th century.

7. (a) *Rafflesia* or Corpse flower is a total root parasite. It obtains the total nourishment from the root of the host plant. Its flowers only come out of the host plant and they have a diameter of 1 m and weight around 10 kg.

8. (a)

9. (b) *Laminaria* (kelp) and *Fucus* (rock weed) are marine algae. They are the members of class- phaeophyceae (brown) algae.

10. (b) Algae *Spirulina* is one of the richest sources of protein, containing 40–50 percent crude protein on dry weight basis which under favourable condition may reach upto 70 percent. So, the people recovering from long illness are advised to take it in the diet.

11. (b) The membrane surrounding a lysosome allows the digestive enzymes to work at the 4.5 pH they require. They are created by the addition of hydrolytic enzymes to early endosomes from the Golgi apparatus.

12. (d) **13. (a)** **14. (c)**

15. (a) Statement (i) and (ii) are correct.
Riccia is liverwort in which simplest sporophyte consists of capsule only while *Polytrichum* is moss in which sporophyte consists of foot, seta & capsule. *Volvox* is a fresh water green colonial alga. Reproduction is both sexual and asexual. Sexual reproduction is oogamous. Slime moulds are consumer decomposer protists. They possess characters of plants (cellulosic cell wall), animals (phagotrophic nutrition) and fungi (spores).

16. (d)

17. (d)
(a) Gametophyte of bryophytes bears protonemal & leafy stage.
(b) In gymnosperm female gametophyte is not free living.
(c) They are present in *Marchantia* or which is a bryophyte.
(d) Origin of seed habit started in pteridophyte *Selaginaella*.

18. (d) **19. (b)** **20. (a)** **21. (a)** **22. (d)**

23. (a) **24. (b)** **25. (d)** **26. (b)**

27. (a) Prothallus of pteridophytes is free-living, mostly photosynthetic small but multicellular and inconspicuous.

28. (d)
- Psilopsida – *Psilotum* – rootless
- Sphenopsida – *Equisetum* – Strobilus
- Lycopsida – *Lycopodium* – Homosporous
- Lycopsida – *Selaginella* – Heterosporous

29. (a) Angiosperms are highly evolved and well adapted land plants. They have both vessels and tracheids in xylem for better conduction of water. Roots are modified into tap roots, adventitious roots, pneumatophores etc. to suit the desired climate.
Sex organs are highly developed, sporophylls are organised into flowers and the flowers are highly coloured or modified to attract pollinators ar different times and places. Insect pollination is more prevalent because it is more efficient and leads to less wastage of pollen grains as compared to wind pollination. So the flowers are made attractive to attract a variety of insects. Seed are more protected as they are enclosed inside a fruit.
All these adaptations have made angiosperms more adaptative in diverse habitats.

30. (d) Tracheophyta are those plants which possess conducting or vascular tissue, xylem and phloem. Xylem transports water and minerals while phloem conducts organic food. Tracheophytes include pteridophytes, gymnosperms and angiosperms.

31. (c) Nearly 50% of total carbon dioxide fixation of photosynthesis of world is carried out by algae.
Photosynthesis by algae releases oxygen in the immediate aquatic environment. It is essential for respiration of aquatic life. Algae are primary producers of food in large bodies of fresh, brackish and sea water.

32. (d) In bryophytes, the zygote develops into a multicellular, undifferentiated structure called embryo. The embryo, within venter of archegonium, by further segmentation and differentiation finally develops into a full fledged sporophyte called sporogonium.

33. (d)

34. (d) The gymnosperms are comparatively more ancient than the angiosperms in evolutionary terms. Most of the gymnosperms have now become extinct and the group is presently represented by only 900 living species. The living gymnosperms are widely distributed in the cold climates where snow is the source of water. *Cycas* and *Ginkgo* are referred to as living fossils.

35. (d) In gymnosperms, pteridophytes and angiosperms, the sporophytic phase is dominant and the gametophytic phase is dependent on sporophyte.

36. (b) In diplontic life cycle, the dominant free living phase is the diploid (2n). Sporophyte is photosynthetic. The gametophytic phase is represented by single to few-celled haploid gametophyte e.g., all seed-bearing plants i.e., gymnosperms and angiosperms.

37. (d) Algae and fungi are grouped under thallophyta. Bryophytes are non vascular embryophytes having an independent gametophyte and parasitic sporophyte.

38. (a) Angiosperms have adapted themeslves to all kinds of habitat-terrestial, aquatic, tropical, deciduous and alpine. Self pollination is seen in very few angiosperms. Production of large number of seeds ensure that at least some will germinate. Not all plants have been domesticated by man.

39. (d) Blue-green algae which grow in hot water springs (at about $70^{o}C$) are *Oscillatoria terebriformis*, *Oscillatoria brevis* etc. These blue-green algae are also called thermophytes. The temperature tolerance of these algae is due to the presence of homopolar bonds in their proteins.

40. (b) *Cladophora* is an autotrophic and filamentous algae which occurs in fresh as well as in marine water.

41. (a) The pyrenoids are small spherical protein bodies surrounded by starch deposition. They are found singly or in numbers embedded in the chloroplast of many algae and bryophytes.

42. (c) Phycocyanin pigment is found in blue-green algae (myxophycean algae). The reserve food material is in the form of cyanophycean starch.

43. (c) *Cephaleuros virescens* grows as a parasite on the leaves of tea and causes red rust of tea. It is the common intercellular parasitic algae of chlorophyceae.

44. (b)

45. (b)

DPP /CB04

1. (b) The terms Porifera was given by Grant, the phylum includes animals with pores in their body. Its classification based on skeleton or spicules.

2. (c) Chordates are featured by the presence of the following characters : Notochord (cephalic or head region), Pharyngeal gill silts, Postanal tail.

3. (b) Lampreys and hagfishes are unusual, jawless fish that comprise the order Cyclostomata, so named because of the circular shape of the mouth.

4. (d)

5. (a) Aschelminthes is bilaterally symmetrical and triploblastic. These are mostly aquatic, free living or parasitic. Their body is three layered which is ectoderm, mesoderm and endoderm.

6. (c)

7. (c) Characteristic of phylum-Annelida is pseudocoelomate. Pseudocoelomate is any invertebrate animal whose body cavity is a pseudocoel, a cavity between the gut and the outer body wall derived from a persistent blastocoel, rather than a true coelom. Pseudocoelomate animals include the Rotifera and Nematoda.

8. (c) Mammals have 12 pairs of cranial nerves.

9. (b)

10. (d) Poison glands of snake are modified parotid salivary gland.

11. (c)

12. (a) All sponges are marine and have collared cells without any exception. Sponges are animals of the phylum Porifera. They are multicellular organisms which have bodies full of pores and channels allowing water to circulate through them, consisting of jelly-like substance sandwiched between two thin layers of cells.

13. (b) 14. (b) 15. (c) 16. (c) 17. (a)

18. (c)

19. (d) Annelids are first to evolve true metameric segmentation. They are present in embryo as well as in adults. They are present both in ectoderm as well as in mesoderm and are repetitive.

20. (c) Presence of coelom posses a problem for circulation of oxygen and nutrients.

21. (c) Birds belong to class Aves. Bats belong to class Mammalia. Both are warm blooded, endothermic and maintain a constant body temperature. Non-vascular air sacs connected to lungs to supplement respiration are present only in birds not bats.

22. (d) In the molluscs mantle is a loose fold of skin, not concerned with locomotion.

23. (a) In birds syrinx is the sound box.

24. (c) *Tubifex* is blood worm, it is an annelid.

25. (c) In all chordates notochord is present at some stage of embryonic development. Hemichordates do not possess notochord; instead of this they possess stomochord, ectodermal in origin.

26. (d) Birds have internal fertilization.

27. (b) *Adamsia* – Sea anemone (coelenterate)

28. (a) In whales, *Balaenoptera* external ear pinna is absent.

29. (a) A body cavity can mean any internal space, or a series of spaces present inside body, whereas coelom or true body cavity generally refers to a large fluid-filled space (cavity) lying between the outer body wall and the inner digestive tube. In acoelomates, no body cavity or coelom is present. Embryonic mesoderm remains as a solid layer, space between endoderm (gut wall) and ectoderm (body wall) is filled with mesenchyme and muscle fibres. In pseudocoelomates, body space is a pseudocoelom or false coelom. In coelomates or eucoelomates, body space is a true coelom, enclosed by mesoderm on both sides. Aschelminthes are pseudocoelomates. Molluscs and insects are coelomates while flatworms are acoelomates.

30. (b) Mollusca is normally oviparous and its development may be direct or indirect. If development is indirect then it occurs through trochophore or veliger larva. Echinoderms show bilateral symmetry in larvae but pentamerous radial symmetry adult. Fertilization is external. In arthopods, body is divided into head, thorax and abdomen. Respiratory organs consists of book gills, book lungs and tracheae. Notochord is present in chordates at some stage of their lives. Urinary and anal openings, may or may not be separate.

31. (b) In reptiles, fertilization is internal and development is direct.

32. (d) The body cavity of coelomates develops from the mesoderm and contains a peritoneum. The acoelomates lack a body cavity.
33. (b) Because they are not structurally robust, heavy wave action would destroy large, upright sponges.
34. (c) The Ctenophora have evolved a complete gut with a mouth and two anal pores.
35. (c) There are no eyes but photoreceptors do occur on prostomium and dorsal epidermis. They have been, of course, called "ocelli of earthworm".
36. (b) The phylum Rotifera are pseudocoelomates and have a pseudocoel.
37. (a) The segmentation of the annelids allows for more complex coordinated movement.
38. (c) Similar body halves could be obtained with either radial or biradial symmetry. Spherical symmetry has no main body axis along which to cut, and bilateral symmetry produces mirror-image halves.
39. (d) Bilateral animals tend to move through the environment. cephalization is important in the control and coordination of this locomotion.
40. (b) Olfactory chemoreceptors means olfactoreceptors.
41. (d) Corals and sea anemones are members of the cnidarian class Anthozoa.
42. (d) Nematocysts, the stinging cells found in cnidocytes, are the only item in this list that the cnidarians possess exclusively.
43. (d) Flatworms are bilaterally symmetrical and triploblastic animals.
44. (d) A garden snail possesses all of these structures.
45. (a) Medusa and polyp are two types of body shapes of Cnidaria, which includes jellyfish, sea anemones, corals and hydrozoans. Medusa has an umbrella shape. Polyp is umbrella in shape also but inverted. Both medusae and polyps have gastrovascular cavities, tentacles and a mouth. Spongin is a protein found in the inside layer of a sponge. it helps in its structural support.

DPP /CB05

1. (d) The fruit is a mature or ripened ovary. When a fruit develops exclusively from the ovary, it is said to be true fruit. When in addition to the ovary, some other floral part also participates in the formation of fruits, then it is known as false fruit. Apple, pear, cashewnut, mulberry etc. are all false fruits.
2. (a)
3. (a) Single cotyledon of embryo in cereal grain is represented by scutellum. Coleoptile represents the covering of stem. Coleorrhiza represents the covering of root.
4. (d) Desert plants have well developed root system so that they can absorb water from the deeper layers of soil. They have sunken stomata and reduced leaves which reduce the rate of water loss through transpiration.
5. (a)
6. (d) Insectivorous plants grown in nitrogen deficient soil. Therefore, these plants capture insects and have the ability to digest them (their protein). Since proteins are made up of amino acids, having nitrogen in their structure (amino group), these plants overcome the deficiency of nitrogen which is essential for their growth.
7. (b) **8. (b)** **9. (d)** **10. (d)** **11. (d)**
12. (c) **13. (a)**
14. (c) In *Cocos nucifera* (coconut) milky endosperm is found in which many nuclei, vitamins and growth hormone e.g., cytokinins, auxin and induced cytokinin is found.
15. (a) **16. (d)** **17. (c)** **18. (a)**
19. (a) Epigynous flower ⇒ $\overline{G}$ e.g. Cucumber
Perigynous flower ⇒ G – e.g. Rose and plum
Hypogynous flower ⇒ $\underline{G}$ e.g. Brinjal
20. (c)
21. (b) Caryopsis is a small, indehiscent, one seeded fruit developing from a monocarpellary ovary in which the pericarp is fused with the seed coat. The seed completely fills the chamber, e.g., wheat, maize.
22. (c) Polyarch condition
23. (a)
24. (c) Opuntia has phylloclade for food synthesis.
25. (a) Sub-aerial stem
26. (c) Inferior ovary
27. (c) Drupe is the fruit type in mango & coconut.
28. (c) When stamens are attached to the perianth, they are known as epiphyllous, e.g., Asparagus, lily.
29. (b) In perigynous condition of a flower, the gynoecium is situated in the centre and other floral parts are located on the rim of the thalamus almost at the same level. Ovary is said to be half-inferior, e.g., *Rosa* (Flask-shaped thalamus), *Prunus* (Cup-shaped thalamus).
30. (a) The given floral diagram is of family Solanaceae (potato family). Its flower is bisexual and actinomorphic, abracteate or bracteate, pentamerous, cyclic. Calyx 5, gamosepalous, persistent. Corolla 5, gamopetalous, often plicate in bud. Androecium 5, polyandrous and epipetalous. Gynoecium bicarpellary and syncarpous. Ovary superior, placed obliquely, placentation axile with swollen-placenta. Fruit is berry or capsule.
31. (c) Liliaceae (Lily family) and Poaceae (= Gramineae, gross family) are the two monocot families.
32. (b) In *Nepenthes*, the pitchers are meant for catching and digesting insects. The lamina is modified into pitcher. The leaf apex gives rise to a coloured lid for attracting the insects.
33. (a) In Dahlia, roots do not originate from radicles and are therefore, adventitious. These roots are fleshy having no definite shape, i.e. tuberous in nature. The tuberous roots occur in group or fascicle and are also called fasciculated. Roots of radish, carrot and beet that originate from radicle are the examples of modified tap root.
34. (d) The main function of root-cap is to protect the growing apex from soil particles. Plant growing in water (hydrophytes) or on another plant (epiphytes) or in another plant (parasites) are devoid of root-cap.
35. (d) The coralloid root of *Cycas* and pneuamatophores of mangroves (like *Rhizophora*) become negatively geotropic i.e., come above the soil surface, due to bacterial infection and for aeration, respectively.
36. (b) *Santalum album* (Sandal wood plant) is a small tree, but at the young stage remains as a parasite on the roots of other plants.
37. (b) For storage, tap roots are modified into four ways i. e., napiform, fusiform, conical and tuberous. In the latter form there is no definite shape, as found in *Mirabilis*. A point to note that tuberous root may develop either from tap root or from adventitious root.
38. (c)
39. (b) In many monocots, the stem is represented by underground modifications. However, the flowers are developed on a axis called scape or pseudostem. Such type of development is found in onion, aroids, banana etc.
40. (a) Sweet potato represents the adventitious modified root of *Ipomoea* plant.
41. (c) Epiphyllous bud is a type of adventitious bud, i.e, not originating from stem apex or axil of a leaf. Usually it develops from margin (or leaf surface) of leaf as in *Bryophytlum, Kalanchoe etc*. It serves the function of vegetative propagation.

42. (d) Tuber is a modified stem. A stem can not be developed on root. In potato plant, tubers develop on a special branch of the stem called stolon.

43. (b) **44. (b)**

45. (b) Like phylloclade, cladode is also a modification of stem. But here the branch or axillary bud is only modified into a flat, tree like structure with only one internode.

DPP /CB06

1. (b)

2. (d) Function of companion cell is to load sugar and amino acids into sieve elements. These cells use transmembrane proteins to take up by active transport.

3. (c) Phellem, phellogen and phelloderm are collectively called periderm.

4. (d) Submerged hydrophytes do not have stomata (a protective mechanism in aquatic plants against water logging of internal cells and tissues).

5. (d) Tracheids are chief water conducting elements of xylem in gymnosperms. They are devoid of protoplasm and hence dead. The wall constituting the tracheids is hard, thick and lignified. These are elongated cells with tapering ends.

6. (d)

7. (b) Vascular cambium is produced by two types of meristems, fascicular and interfascicular cambium.

8. (d) Vessels are elongated, multicellular water conducting channels with wide lumen formed by end to end fusion of a large number of vessel elements. Tracheids are elongated dead cells with tapering ends having lignified walls with large or wide lumen. Their main function is conduction of water and minerals from root to leaf.

9. (c) The concept of quiescent centre was proposed by Clowes in 1961. On the basis of autoradiographic studies of DNA synthesis in the root tip of *Zea*, he found a reservoir of cells having low DNA, RNA and protein concentration. They may or may not divide. It is resistant to damages.

10. (d) **11. (b)**

12. (b) The common bottle cork is the product of phellogen. Phellogen produces cork or phellem on the outer side. It consists of dead and compactly arranged rectangular cells that possess suberised cells walls. The cork cells contain tannins. Hence, they appear brown or dark brown in colour. The cork cells of some plants are filled with air *e.g.*, *Quercus suber* (Cork Oak or Bottle Cork).

13. (b)

14. (d) In submerged hydrophytes, whole plant body remains under water. *e.g. Ceratophyllum* and *Utricularia*. In these plants, stomata is absent and gaseous exchange takes place through general body surface.

15. (d) In collenchyma cell walls show localized thickenings due to presence of approximately 45% pectin, 35% hemicellulose and 20% cellulose.

16. (c) Being a xerophytic plant, *Nerium* bears multiple epidermis to cut the rate of transpiration.

17. (a)

18. (a) Secondary wall situated near the plasma membrane after the formation of primary wall.

19. (d) **20. (a)** **21. (d)** **22. (d)**

23. (a) Based on position of protoxylem in relation to metaxylem, the xylem may be exach/centripetal, endarch/centrifugal, mesarch and centerarch. In endarch condition, protoxylem lies on the inner side of metaxylem e.g., dicot and monocot stems.

24. (a) A monocot stem lacks secondary growth. The vascular bundles are oval or rounded in outline. They contain both phloem and xylem. Phloem lies towards the outside and the xylem on the inner side. Cambium is absent as the whole procambium is consumed in the formation of vascular tissues. Xylem is in the form of the letter Y. It is endarch, i.e., protoxylem lies towards the centre of the stem. Xylem is made up of vessels, tracheids, xylem parenchyma and a few xylem fibres. Metaxylem generally consists of two large oval of rounded vessels lying at the upper two angles of xylem. Protoxylem cavity is present at the end of protoxylem vessels.

25. (d) Heart wood (duramen) is the central wood of an old stem. It is dark coloured. Living cells are absent. Heart wood is the part of secondary xylem. The tracheary elements are plugged by tyloses. Tracheary elements have deposition of tannins, resins, gums, etc. Heart wood is heavier. It is more durable due to its little susceptibility to the attack of pathogens and insects. Heart wood is mechanical in function. The outer or peripheral portion of the trunk is lighter in colour and soft which performs the functions of conduction of water and minerals and it is known as sap wood or alburnum.

26. (d) Intercalated between mature tissues, it helps in regeneration.

27. (d) Spring wood or earlywood

28. (a) Shoot apical meristem

29. (c) Companion cells control activities of sieve tube.

30. (c)

31. (d) Internal (physiological) and external (environmental) factors.

32. (d)

33. (d) Meristematic zone

34. (b) Thickening of wall is due to deposition of cellulose, hemicellulose and pectin.

35. (b) Endodermis with casparian strips is found in dicot stem.

36. (d)

37. (d) The electron microscope revealed al the structural details of the cell.

38. (c)

39. (d) Important functions of veins are : (i) Conduction of water through xylem; (ii) Providing channels for translocation of organic nutrients; (iii) Conduction of minerals; (iv) By their large number, the veins and veinlets provide skeletal support to the lamina so that it can remain stretched for its optimum functioning; (v) Veins and veinlets reduce the effect of wilting.

40. (b) *Cuscuta* is a total parasite so it absorbs the prepared food from the phloem of the host, hence haustoria reaches upto phloem of host.

41. (c) Tylose is a balloon-like outgrowth of paratracheal parenchyma into a pit in the wall of a vessel or tracheid and a xylem parenchyma cell lying next to it. This xylem parenchyma occurs at the edge of annual ring around the vessels.

42. (c) Epidermis is generally uniseriate. i.e., compsoed of single layer of epidermal cells.
In some cases, it is multilayered also. e.g., *Ficus*, *Nerium*, *Peperomia*, etc.

43. (a) In the cortex of monocot root, we observe a few layers of cell below the epidermis which have thick walls due to the deposition of a chemical suberin. These layers of suberized cells are called exodermis.
There are also number alternating zones of xylem present in root. The number of xylem patches far exceeds to ten. That is why, they are called polyarch. In monocot root, there is a large sized pith made up of parenchyma tissues.

44. (c) Phellem is a suberized cell formed outside the region of stem followed by endodermis, inside the phloem.
Pericycle lies immediately inside the endodermis of the dicotyledonous stem phloem. Phloem in characterized by the presence of sieve tubes.

45. (c) Tunica corpus theory was proposed by Schmidt. According to this theory, two tissue zones occur at the apex.

DPP /CB07

1. (d) Squamous epithelium is formed of thin discoidal and polygonal cells that fit like tiles in a floor, so is also called pavement epithelium. It is found in the walls of blood vessels, in the alveoli of lungs for exchange of gas, and in Bowman's capsule of nephron for ultra filtration.

2. (b) The cell junctions called tight, adhering and gap junctions are found in epithelial tissue. Epithelial tissue covers the whole surface of the body. It is made up of cells closely packed and arranged in one or more layers.

3. (b) 4. (d)

5. (d) Myoglobin is a single-chain globular protein of 153 amino acids, containing a heme (iron-containing porphyrin) prosthetic group in the center around which the remaining apoprotein folds. It has a molecular weight of 16,700 daltons, and is the primary oxygen-carrying pigment of muscle tissues. Unlike the blood-borne hemoglobin, to which it is structurally related, this protein does not exhibit cooperative binding of oxygen, since positive cooperativity is a property of multimeric/oligomeric proteins only.

6. (a)

7. (c) Silver fish (Insecta), scorpion (Arachnida); crab (Crustacea) and honey bee (Insecta) all belong to phylum Arthropoda which is characterized by the presence of jointed appendages. Poison glands occur only in scorpion. Compound eyes and metamorphosis are the characteristic of insects.

8. (c)

9. (a) Lymph differs from blood in that it contains less protein and no red blood cells. Lymph contains white blood cells.

10. (b)

11. (c) Dolphin is an aquatic mammal and breathes through lungs.

12. (c) 13. (b) 14. (a) 15. (a) 16. (c)

17. (a) Sexual dimorphism is found in cockroach. A pair of anal style are present in male cockroach only. Female has broader abdomenal segments.

18. (a) Presence of air passages in the bones (pneumatic bones) is a characteristic of birds.

19. (a) 20. (c)

21. (b) Nephridia in earthworm, malpighian tubules in cockroach and urinary tubules in the rat are excretory in function.

22. (c) 23. (a) 24. (c) 25. (b) 26. (d)

27. (d) 28. (b) 29. (c) 30. (c)

31. (c) Spiracles are 20 in number

32. (c)

33. (d) Propelling mucus is the function of simple epithelium.

34. (c) Imitability is a property only shown by cardiac muscles

35. (b) 36. (b) 37. (c)

38. (c) Myocardium is the muscular part. Pericardium and endocardium are the linings of epithelium.

39. (c) This cartilage is found in intervertebral discs.

40. (d) These granules are composed of RNA and protein.

41. (b) The GI tract is lined with simple columnar epithelium, which allows a maximum number of cells to contact food particles.

42. (a) Most epithelia have a basement membrane between the epithelial cells and the underlying connective tissue.

43. (a)

44. (b) Bone is surrounded by dense, white fibrous sheath called periosteum.

45. (b) A - Ocellus; B - Compound eye; C - Mandible; D - Maxilla; E - Labrum; F - Labium.

DPP /CB08

1. (c) Glycosylation is the process or result of addition of saccharides to proteins and lipids. The process is one of the four principal co-translational and post-translational modification steps in the synthesis of membrane and secreted proteins and the majority of proteins synthesized in the rough ER undergo glycosylation.

2. (b) Vacuoles are present mainly in the plant cells. Each vacuole is surrounded by cytoplasmic membrane called as tonoplast which is similar to plasma membrane.

3. (b) The membrane surrounding a lysosome allows the digestive enzymes to work at the 4.5 pH they require. They are created by the addition of hydrolytic enzymes to early endosomes from the Golgi apparatus.

4. (c)

5. (c) Nucleolus was discovered by Fontana (1781) and given name by Bowman (1840). It does not have membrane and is attached to chromatin at nucleolar organiser region (NOR). Nucleolus is the site for elaboration of r-RNA and synthesis of ribsomes, hence called ribosomal factory.

6. (b)

7. (a) The fluidity of membranes in a plant in cold weather may be maintained by increasing the number of phospholipids with unsaturated hydrocarbon tails.

8. (c) 9. (a) 10. (b)

11. (b) Fimbriae are hair like structures present in large number in bacteria. They help in attaching bacteria to solid surfaces or host tissues.

12. (d) Proteins have very specific shapes which make them ideal as receptor molecules for chemical signalling between cells. Branching side chain glycolipids on the outer surface of cell membranes are also involved in cell-cell recognition.

13. (a) The SER provides surface for the synthesis of lipids, including phospholipids, cholesterol, steroid hormones (sex hormones, adrenal corticoid hormones), ascorbic acid and visual pigments.

14. (a)

15. (b) Phospholipids in the lipid bilayer limit the permeability of the membrane.

16. (c) Vacuole is a non - living reservoir, bounded by a selectively permeable membrane, the tonoplast. It is not a air filled cavity but it is filled with a highly concentrated solution called vascular sap or cell sap. pH of vacuolar cell sap is acidic and hypertonic.

17. (c) Plastids are double membranous, semi-autonomous organelles which store and synthesise various types of organic compounds. They develop from colourless precursor proplastids. Proplastids have the ability to divide and differentiate into various types of plastids.

18. (c) Only statements Band E are incorrect as plastids have circular DNA and are found to be present in higher plants.

19. (b) 20. (a)

21. (d) Prokaryotes possess gas vacuole.

22. (d) Membrane-less organelles.

23. (b)

24. (d) All of these

25. (b) 2n = 34

26. (d) 27. (a) 28. (b) 29. (d) 30. (b)

31. (d) 32. (c)

33. (b) In 1935, Danielli and Davson proposed that cell membrane is made of a double layer of phospolipid molecules sandwiched between two single layers of proteins. The three layers are held together by electrostatic forces while phospholipid layers are kept adhered by vander Waal's forces.

34. (a)

35. (d) The cell membrane is asymmetric and has different properties, and functions of the cytoplasmic side versus the extracellular side. These properties arise from differences in the constituents of the membrane.

36. **(b)** Both glycolipids and glycoproteins serve as recognition signals.
37. **(a)** The charged or polar lining of the channel proteins allows passage of polar and charged molecules.
38. **(d)** All cells have a plasma membrane. The other structures listed are organelles and therefore are present only in eukaryotes.
39. **(d)**
40. **(c)** The cytoskeleton supports the cell and allows for movement of the entire cell and listed are part of the cytoskeleton.
41. **(d)** **42.** **(c)** **43.** **(b)**
44. **(c)** Plants are autotrophs and synthesize their food in the process of photosynthesis with the help of chloroplast (plastid).
45. **(d)** Peroxisomes contain glycolic acid and oxidase, which oxidises glycolic acid (a product of photosynthesis) to glyoxylic acid.

DPP /CB09

1. **(c)** The nucleic acid (DNA and RNA) are repeating units of nucleotides i.e. polynucleotides. Each nucleotide comprises of nitrogenous heterocyclic bases viz. purines or pyrimidines, pentose sugar and phosphoric acid.
2. **(b)** Glycogen is an animal starch, stored in the liver and is polysaccharide of α – Glucose. About 30,000 glucose molecules joined by 1-4 α -glycosidic bonds and its branches by 1-6 glycosidic bonds. It gives red colour with iodine solution.
- Galactose is a monosaccharide from milk.
- Fructose is a monosaccharide from fruit.
- Sucrose is a disaccharide (Glucose + Fructose).

3. **(b)** Cellulose is the most abundant organic compound, most abundant polysaccharide and most abundant biopolymer found on earth.
4. **(c)** In the cytoplasm, protein synthesis is restricted to the ribosomes. Mitochondria being a semiautonomous organelle, has its own genetic machinery to synthesize its proteins.
5. **(d)** RNA is a single chain of ribonucleotides. Each ribonucleotide consists of nitrogenous bases (adenine, guanine, cytosine and uracil), ribose sugar and phosphoric acid.
6. **(a)** Reducing sugar is any sugar that has an aldehyde group or is capable of forming one in solution through isomerisation. Reducing monosaccharides include glucose, fructose, glyceraldehyde and galactose. Many disaccharides, like lactose and maltose also have a reducing form, as one of the two units may have an open- chain form with an aldehyde group.
However, sucrose and trihalose in which the anomeric carbons of the two units are linked together, are non reducing disaccharides since neither of the rings is capable of opening.
7. **(d)** α-amylase enzyme stimulates the germination of barley seed.
8. **(a)** Massive ions like Na^+ facilitate the absorption of substances like amino acid and glucose through cotransport.
9. **(d)** Enzymes accelerate chemical reaction by lowering the activation energy.
10. **(c)** Competitive inhibition is the reversible inhibition of enzyme activity due to presence of substrate analogues. Non competitive inhibition is the reduction of enzyme activity by a factor that has no real structural similarity with the substrate. Allosteric inhibition is reversible non-competitive inhibition occurring in case of allosteric enzymes . Herein, the inhibitors are the products or intermediates of reactions catalyzed by the enzymes. Hence, it is also called end product inhibition or feedback inhibition.
11. **(c)** There are only 20 amino acids . These can be arranged in different order in the polypeptide chain to form a diverse array of proteins.
12. **(a)** Length of one turn of DNA helix is 34Å.
$1Å = 10^{-1}$ nm
13. **(c)** K_m (Michealis Menten constant) is defined as that substrate concentration at which under optimum conditions the rate of an enzyme catalysed reaction reaches half the maximum rate. K_m is inversely proportional to affinity of enzyme for its substrate.
14. **(b)** **15.** **(a)** **16.** **(d)** **17.** **(a)** **18.** **(a)**
19. **(d)** **20.** **(b)** **21.** **(d)** **22.** **(c)** **23.** **(b)**
24. **(c)** **25.** **(b)**
26. **(b)** Phospholipids are triglyceride lipids, in which one fatty acid is replaced by phosphoric acid residue often linked to additional nitrogenous groups like choline (in lecithin), ethanolamine (in cephalin) etc.

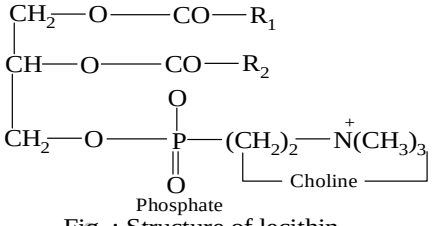
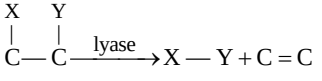


Fig. : Structure of lecithin.

27. **(b)** Polysaccharides, monosaccharides are linked together by glycosidic bond (C–O–C). Water has hydrogen bonding. Proteins and polymers of different amino acids, which are linked by peptide (CONH) bond formed by dehydration (polymerisation) between COOH group of one amino acid and NH_2 group of next amino acid with the removal of H_2O. The three hydroxyl groups of a glycerol molecule join with the the carboxyl groups of three fatty acid molecules to form a fat or triglyceride molecule. The chemical linkage between the glycerol and fatty acids is called the ester bond.
28. **(a)** Chitin is the second most abundant polysaccharide (after cellulose). Chitin is not a storage polysaccharide rather it is a structural homopolysaccharide, formed of N-acetylglucosamine (NAG) monomers joined together by β-1, 4 linkages. Also, it forms the structural component of fungal walls and exoskeleton of arthropods.
29. **(b)**

Some Secondary Metabolites	
Pigments	Carotenoids, anthocyanins, etc.
Alkaloids	Morphine, Codeine, etc.
Terpenoids	Monoterpenes, Diterpenes, etc.
Essential oils	Lemon grass oil, etc.
Toxins	Abrin, Ricin
Lectins	Concanavalin A
Drugs	Vinblastin, Curcumin, etc.
Polymeric substances	Rubber, Gums, Cellulose.

Vinblastin is used as an anticancer drug, whereas curcumin is a component of turmeric and also used as drug.
30. **(b)** Lyases enzyme catalyze the breakage of specific covalent bonds and removal of groups without hydrolysis producing double bonds or removal of double bonds by adding groups e.g., histidine decarboxylase that splits C–C bond of histidine, forming CO_2 and histamine.



Fructose-1, 6 diphosphate $\xrightarrow{\text{Aldolase}}$ Dihydroxyacetone-3-phosphate + Glyceraldehyde-3-phosphate.

31. (c) Successive glucose units are linked together by α 1 $\rightarrow$ 4 linkage and at branchings α 1 $\rightarrow$ 6 linkage is present.

32. (c) **33. (c)**

34. (b) Tertiary structure of proteius is devoid of phosphodiester bonds. There bonds are present in nudeic acids.

35. (b)

36. (a) A high k_m indicates low affinity of an enzyme for its substrate.

37. (d) The multiple molecular forms of an enzyme occuring in the same organisms and having a similar substrate activity are called isoenzymes or isozymes. They have similar properties but different molecular weights and location. Over 100 enzymes are known to have isoenzymes. α-amylase of wheat endosperm has 16 isozymes, lactate dehydrogenase has 5 isozymes.

38. (d) Essential amino acids are the amino acids which cannot be synthesized by organisms in the body and are obtained from plants e.g., valine, leucine, isoleucine, phenylalanine, threonin, lysine, tryptophan, methionine.
Non-essential amino acids can be synthesized by the organism and may not be the requisite components of diet e.g., serine, tryosine, aspartate, cysteine, glutamate, proline, glycrine, alanine, asparagine, glutamine and tyrosine.

39. (a) Acidic amino acids have an extra carboxylic group (mono-amino dicarboxylic), e.g., glutamate (glutamic acid, Glu), asparate (aspartic acid, Asp).
Basic amino acids have an additional amino group without forming amides (diamino monocarboxylic), e.g., arginine (Arg), lysine (Lys).
Neutral amino acids have one amino group and one carboxylic group (mono-amino mnocarboxylic) with noncyclic hydrocarbon chain, e.g., glycine (Gly), alanine (Ala), valine (Val), Leucine (Leu), isoleucine (lle). Essential amino acids are the amino acids which cannot be synthesized by organisms in the body and are obtained from plants e.g., valine, leucine, isoleucine, phenylalanine, threonin, lysine, tryptophan, methionine.
Non-essential amino acids can be synthesized by the organism and may not be the requisite components of diet e.g., serine, tryosine, aspartate, cysteine, glutamate, proline, glycrine, alanine, asparagine, glutamine and tyrosine.

40. (d)

41. (b) Trehalose is a non-reducing sugar. It is made up to 2 molecules of glucose

42. (c) **43. (a)** **44. (d)**

45. (a) Palmitic acid is one of the most common saturated fatty acids found in animals and plants. It has 16 carbons including the carboxyl carbon.

DPP /CB10

1. (d) G_1 phase, also called Gap I phase is characterized by increase in cell size. In the S phase or synthetic phase DNA molecules replicate. G_2 is the second growth phase or Gap II where in there is intensive formation of RNAs and proteins. In the mitotic metaphase, the chromosomes are arranged at the equatorial plate.

2. (b) Kinetochore is the proteinaceous covering of centriole, to which spindle fibers attach.

3. (b) Mitosis is the process in which eukaryotic cell separates the chromosomes in its cell nucleus, into two identical sets in two daughter nuclei. It is generally followed immediately by cytokinesis, which divides the nuclei, cytoplasm, organelles and cell membrane into two daughter cells containing roughly equal shares of these cellular components. Mitosis and cytokinesis together define the mitotic (M) phase of the cell cycle - the division of the mother cell into two daughter cells, genetically identical to each other and to their parent cell.

4. (d) In bivalent formation of chromosomes during meiosis, the homologous chromosomes are arranged in pairs. The phenomenon is called synapsis and it occurs during zygotene stage. DNA replication occurs during S phase or synthetic phase which is the second phase of interphase.

5. (a) **6. (b)** **7. (b)** **8. (b)** **9. (b)**

10. (c) **11. (b)**

12. (d) During telophase, the individual chromosomes are no longer seen and chromatin material tends to collect in a mass at the two poles. Chromosomes cluster at opposite spindle poles and their identity is lost as discrete elements. Nuclear envelope assembles around the chromosome clusters. Nucleolus, Golgi complex and ER reform.

13. (a) **14. (c)**

15. (a) Condensation initiates in prophase.

16. (c) Interkinesis is the stage that occurs in between meiosis-I and meosis-II

17. (a) During anaphase, centromeres split resulting in the separation of sister chromatids towards opposite poles.

18. (c) **19. (d)** **20. (a)**

21. (d) A = Diplotene B = Dissolution
C = Pchytene D = Anaphase - II

22. (d) The lampbrush chromosomes occuring in prophase of meiosis II are highly elongated special kind of synapsed mid-prophase or diplotene chromosome bivalents which have already undergone crossing over. Lampbrush chromosomes occur in pairs. Each chromosome of a pair has a double main axis due to presence of two elongated chromatids. Both the adjacent chromatids bear rows of large number of chromomeres. Two adjacent chromomeres are separated by interchromomeric stretches. Many of the chromomeres give out lateral projections or loops. The lateral loops provide a test tube or lampbrush-like appearance to the chromosome pair. Lateral loops take part in rapid transcription of DNA to mRNA meant for synthesis of yolk and other substances required for growth and development of meiocytes.

23. (a) The mitotic spindle forms and the nuclear membrane disperses during prophase.

24. (b) If at G_1 cells are given the signal to divide, they are unlikely to be stopped at subsequent checkpoints.

25. (a) Sister chromatids are the two identical strands of a duplicated chromosome.

26. (d) Meiosis reduces the chromosome count from diploid to haploid and halves the amount of genetic material.

27. (d) Kinetochores are assembled at the centromere of each chromosome and are the sites where microtubules attach to segregate the chromosomes. In meiosis there is only one fused kinetochore per chromosome; in mitosis there are two kinetochores per chromosome.

28. (d) Chromosomes are attached tot he microtubules at their kinetochores. There are molecular motors at the kinetochores which help move the chromosomes to the poles by the shortening of the kinetochore microtubules.

29. (c) Programmed cell death occurs during the development of many organisms (for instance, tadpoles lose their tails to become adult frogs). One of the stimuli for programmed cell death. Necrosis (cell death that is not programmed) occurs when cells have been deprived of cell cycle, in which cells reproduce, and is not a step in programmed cell death.

30. (b) After fertilization, the DNA content in the cell increases because of the fusion of genetic material of the parents. Mitosis then occurs and is followed by cytokinesis at x, which is the division of the cytoplasm into 2 compartments, i.e. 2 cells.

31. (a) Although no centrioles are visible, there is spindle formation and the chromosomes do exhibit equatorial arrangement. Spindle formation is probably by another organelle, unknown as yet.

32. (c) At prophase I, DNA replication has already occurred, and the original amount of DNA has been doubled to x. At anaphase I, the amount of DNA in the cell remains the same because no cytokinesis has occurred yet to separate the cytoplasm.

33. (d) G_0 represents a stage in G_1 in which cells are supposed to be withdrawn from division.

34. (c) Restriction point represents a stage in G_1 phase If the cell has passed restriction point, it would divide.

35. (c) Pairing can be procentric proterminal pairing or intermediate condition (also called as random synapsis which may occur simultaneously at all chromomeres).

36. (b) Stock is the one that receives the graft which has 2n = 48. This would produce the root which will have 2n = 48. Scion has 2n = 24, would produce microspore (n = 2)

37. (c) The number of chromosome will be same (50), but each chromosome will have 2 chromatids.

38. (a) No. of required meiosis = $n + \frac{n}{4} = \frac{5n}{4}$

where n = no. of seeds.

$= \frac{5\times10}{4} = \frac{50}{4} = 12.5 = 13$

10 Megaspore + 10 Microspore = 10 seeds

To produce 10 Megaspores, 10 meiotic division would be needed

13 – 10 = 3 meiosis will produce 12 microspore

So, wastage of pollen grain = 2

39. (d) The correct order of mitotic events which occur during meiosis is: Formation of synaptonemal complex, recombination, separation of homologous chromosomes, separation of sister chromatids.

40. (b)

41. (c) Any agent that stimulates cell division is called mitogen e.g., temperature, cytokinin, auxin, gibberellin, insulin and steroids.

42. (c)

43. (d) During the S-period, the centrioles separate and undergo duplication which produces two pairs of centrioles still contained within the radiating masses of microtubules.

44. (a)

45. (c) The given figure shows anaphase I of meiosis. In anaphase I, the homologous chromosomes break apart while sister chromatids remains associated at their centromere. At the end of anaphase I, two groups of chromosomes are produced at two poles, having half the number of parental chromosomes.

DPP/CB11

1. (d)

2. (c) Osmosis is the movement of solvent particles from a region of low solute concentration to a region of high solute concentration through a selectively permeable membrane.

3. (b) **4. (c)**

5. (d) The factors which affect the rate of transpiration are light – stomatal opening, temperature – increases rate of transpiration, humidity – low humidity increases the rate of transpiration whereas high humidity exerts an opposite effect *i.e.* decreases the rate, wind – high wind causes stomatal closure, thereby, reducing the rate of transpiration in plants.

6. (a) Osmotic potential is the potential of a solution to cause water movement into it across a semi- permeable membrane. Water potential is the tendency of water to leave a system.

7. (d) Turgor pressure is the pressure that develops in a cell due to osmotic diffusion of water inside it and is responsible for pushing the membrane against cell wall. Stomata open under conditions of increased turgor pressure of guard cells and stomata gets closed under conditions of decreased turgor pressure of guard cells. When turgid, they swell and bend outward. As a result, the stomatal aperture opens. When they are flaccid, the tension from the wall is released and stomatal aperture closes.

8. (b) Active transport involves movement of ions against concentration gradient involves the expenditure of energy. Diffusion involves the movement of solute particles from region of higher concentration to a region of lower concentration. Pinocytosis is cell drinking. Brownian movement is the random to and fro movement of atoms and molecules.

9. (c)

10. (d) A solution having more solutes as compared to solution having less number of solutes : former is known as hypertonic and latter hypotonic. Hence, solution outside the cytoplasm has more solutes (higher concentration) and are hypertonic. If two solutions have same solute concentration then they are isotonic.

11. (b)

12. (a) During sodium-potassium pump, the concentration of sodium ions will be about 14 times more in extra cellular fluid (outside) and concentration of potassium ions will be about 28-30 times more in axoplasm (inside). Thus, $3Na^+$ and $2K^+$ are transported during the process.

13. (a) In rainy season, door gets swelled due to the phenomenon of imbibition. It is the process of absorption of water without forming a solution.

14. (c) Cell placed in a hypotonic solution becomes turgid due to endosmosis. Water exerts a pressure on the walls of the cell called turgor pressure. Cell wall being a rigid and hard structure also exerts a pressure on Cytoplasm in response to Turgor pressure when TP = WP, DPD = 0 (No net exchange of water).

15. (a) The pure water, at atmospheric pressure has zero water potential. The addition of any solute particles reduces the free energy of water. Thus, the water potential will be negative.

16. (b)

17. (b) Water logging of soil makes it physiologically dry because this condition does not allow oxygen to enter the soil.

18. (c) **19. (b)** **20. (b)**

21. (b) The absorption of water still occurs when concentration of outer soil water is more than root hair cell sap.

22. (d)

23. (b) With increasing humidity, the rate of transpiration decreases linearly, because the high saturation of water vapour in the atmosphere prevents the evaporation of more water from the leaf interior to the exterior.

24. (b) **25. (b)**

26. (d) If we cut a small soft-stemmed plant on a day, when there is plenty of atmospheric moisture, early in the morning we will soon see drops of solution ooze out of the cut stem; this comes out due to the positive root pressure. If we fix a rubber tube to the cut stem as a sleeve we can actually collect and measure the rate of exudation, and also determine the composition of the exudates. Root pressure is a positive pressure that develops in the xylem sap of the root of some plants. It is a manifestation of active water absorption. Root pressure is observed in certain seasons which favours optimum metabolic activity and reduce transpiration. It is more during rainy season in the tropical countries and during spring in temperate habitats.

27. (c) Cohesion tension theory (Cohesion-tension and transpiration pull theory) explains the ascent of sap best. It was put forward by Dixon and Jolly in 1894. It was further improved by Dixon in 1914. Therefore, the theory is also named after him as Dixon's theory of ascent of sap. Today most of the workers believe in this theory.

28. (a) Sap will flow from high to low pressure areas in the plant. Adding sugars to the sap causes water to enter the phloem, thus increasing pressure. Removing sugars causes water to leave the phloem, thereby reducing pressure.

29. (c) The water potential is the sum of the osmotic potential (usually negative) and the pressure potential (usually positive), so WP = –0.24 + 0.16 = –0.08 mPa.

30. (a) Guttation is caused by root pressure. It is only important to the movement of water in quite small plants.

31. (d) As leaf cells lose water, they release abscisic acid, which causes potassium ions to leave guard cells, decreasing their pressure potential and closing stomata.

32. (b) As carbon dioxide is fixed into organic acids at night the pH decreases; metabolism of these acids during the day (with the carbon dioxide going into the citric acid cycle) causes the pH to increase.

33. (a) Choices b, c, and d are true for phloem transport only.

34. (c) Sugar molecules diffuse through the symplast of mesophyll cells, are pumped into the apoplast near a vein, re-enter the symplast of a companion cell, and then move into a sieve tube element.

35. (a) The intercellular spaces and cell walls of the plant constitute the apoplast.

36. (a) Transpiration causes tension.

37. (d) Abscisic acid, light, and carbon dioxide levels all regulate stomatal opening and closing.

38. (a) Stomatal regulators work by activating and deactivating the proton pump in guard cells.

39. (d) **40. (c)** **41. (c)** **42. (a)**

43. (b) The tension created by the evaporation of water from leaf surfaces generates a pull on the water column that moves water and nutrients up the xylem from the roots to the leaves.

44. (c) **45. (d)**

DPP /CB12

1. (b) **2. (c)**

3. (a) Molybdenum is a component of nitrogenase and nitrate reductase involved during N_2 fixation. Copper is essential for photosynthesis and respiration. Zinc is involved in synthesis of auxin. Manganese is activator of enzymes involved in nitrogen metabolism.

4. (b) The root nodules of leguminous plants contain a symbiotic nitrogen fixing bacteria *Rhizobium*. Root nodules are small irregular outgrowth of the roots which are pinkish internally due to presence of a pigment called leghaemoglobin. It is related to blood pigment haemoglobin. The cells of root nodules are tetraploid and contain polyhedral bacteria called bacteroids. Leghaemoglobin is an oxygen scavenger and protects the nitrogen fixing enzyme nitrogenase of bacteroids.

5. (c) 'Whip-tail' disease in cauliflower is noted due to deficiency of molybdenum. Cauliflower is the most sensitive of crops to molybdenum (Mb) deficiency. Light sandy soils with pH levels close to or below pH 6 under conditions of high fertility can show severe Mb deficiency. Molybdenum is the only plant essential micronutrient that becomes less available as the soil acidifies–the opposite of copper, zinc and iron.

6. (b) The essential elements are divided into macroelements and microelements based on the quantity in which they are required by the plants. Mn, Fe, Cu, Mo, Zn, B, and Cl are the micronutrients needed in very small quantities by the plants. C, H, O, N, P, S, K, Ca, Mg, Fe are the macronutrients required in more quantity.

7. (d) Heterotrophic plants are less dependent on nitrogen obtained from nitrification since they receive some nitrite and nitrate through their parasitic or carnivorous nutritional modes.

8. (d) **9. (b)**

10. (d) Root hairs absorb water, minerals and oxygen but they do not absorb CO_2. CO_2 intake takes place in leaves.

11. (c) The ash that is left after burning any dry part of the plant contains only mineral elements and is called plant ash.

12. (b) The atmospheric nitrogen is fixed in the soil in the form of nitrate. Nitrate and ammonium can be taken up by plants or used by other soil organisms. Any nitrate or ammonium that is not used for growth is added to the pool of inorganic nitrogen in the soil.

13. (c) Cultivation of plants by placing the roots in the nutrient solution without any soil is called hydroponics. It is also known as soilless culture/ water culture/ solution culture. It is used to determine which elements are essential for plant growth and what symptoms are produced by the absence or deficiency of essential elements.

14. (c) **15. (c)**

16. (a) Cobalt stimulates growth of legumes such as beans, clover and alfalfa. This stimulation of growth by cobalt is due to its use, not by the plant itself, but by nitrogen-fixing bacteria that live in roots of plants.

17. (b) **18. (a)** **19. (a)** **20. (b)** **21. (b)**

22. (d)

23. (b) Magnesium activates the enzymes of respiration, photosynthesis and is involved in the synthesis of DNA and RNA. Manganese activates many enzymes which are involved in photosynthesis, respiration and nitrogen metabolism.

24. (a) NO_3^-, is negatively charged and not tightly bound to soil particles.

25. (d) Legume roots have swellings called nodules that contain nitrogen-fixing bacteria of the genus Rhizobium.

26. (b) The main difference between micronutrients and macronutrients is in how much of them a plant needs to survive.

27. (c) Symptoms caused by deficiency of essential mineral elements on plants are called Hunger signs.

28. (a) The deficiency of calcium results in death of leaf, stem and root apices.

29. (c) Hydrogen sulphide has little to do with ion exchange.

30. (b) Due to immobile property of sulphur, chlorosis occurs first in young leaves.

31. (c) All other statements are false.

32. (a) The characteristic symptom of iron deficiency is the interveinal chlorosis. The symptom may be general or localised to a single leaf or a single branch because of the limited mobility of iron in the tissues. The deficiency symptom first appears in young leaves.

33. (d) An iron deficiency is suspected in a plant. If the older leaves are yellow, a nitrogen deficiency would be suspected because nitrogen is easily relocated in the plant while iron is not.

34. (d) **35. (d)**

36. (d) The bulk of the organic material of a plant is derived from carbon dioxide assimilated from the atmosphere.

37. (b) For chlorophyll formation, a plant needs Fe, Mg & light

38. (c) **39. (a)** **40. (b)** **41. (c)** **42. (a)**

43. (b) "Reclamation" and "Little leaf" disease is caused by deficiency of Cu and Zn.

44. (a) **45. (a)**

DPP /CB13

1. (a)

2. (c) The C_4 pathway allows photosynthesis to occur at very low concentrations of carbon dioxide as PEP carboxylase has an extremely high affinity for carbon dioxide. This pathway also works well at high temperatures and light intensity, enabling efficient photosynthesis in tropical plants.

3. (a) Photorespiratory loss of CO_2 occurs when RuBisCo starts functioning as an oxygenase instead of carboxylase under conditions of high O_2 and low CO_2. It involves three organelles chloroplast, mitochondria and peroxisomes. Half of the photosynthetically fixed carbon (in the form of RuBP) may be lost into the atmosphere through this process and no ATP formation occurs.

4. (d) **5. (a)**

6. (c) The process of photorespiration requires 3 cell organelles-mitochondria, chloroplasts and peroxisomes. In chloroplasts glycolate is formed from ribulose biphosphate which passes into peroxisomes to be changed into glyoxylate. In this reaction H_2O_2 is evolved. Glyoxylate is changed to glycine which now enters mitochondria. Two molecules of glycine combine to form one molecule of serine with the evolution of CO_2.

7. (b) Grana are present inside the chloroplasts. Each granum may contain 10 – 100 thylakoids. Thylakoids or baggy trousers are membrane lined flattened sacs. Thylokoids (or granna) contain chloroplast proteins, photosynthetic pigments and other factors required for photosynthesis.

8. (b) Photosynthesis takes place only in the visible part (400 - 700 nm wavelength) of electromagnetic radiations. Hence, this component comprises the photo-synthetically active radiation.

9. (a) **10. (a)** **11. (a)**

12. (b) RuBisCo is the enzyme involved in Calvin cycle. Nitrogenase catalyses nitrogenation. Invertase catalyses breaking of sucrose to glucose and fructose.

13. (a) The primary acceptor of CO_2 in C_4 plants is phosphoenol pyruvate or PEP. PEP in mesophyll cells combine with CO_2 and is converted into 4 carbon compound oxaloacetic acid by PEP carboxylase. In C_3 plant, Ribulose 1, 5–diphosphate is primary acceptor of CO_2.

14. (a) Photolysis is catalysed by the protein-bound inorganic complex containing manganese ions (oxygen evolving complex) of photosystem II.

15. (c) **16. (c)** **17. (d)** **18. (d)** **19. (d)** **20. (a)**
21. (b) **22. (c)** **23. (c)** **24. (a)** **25. (d)** **26. (b)**
27. (c) **28. (c)** **29. (d)**

30. (a) Oxygen is a product of photosynthesis. A small quantity of O_2 is essential for photosynthesis to take place. But as O_2 concentration rises, rate of photosynthesis decreases. It may be because (i) Oxygen takes part in oxidation of photosynthetic pigments, intermediates and enzymes in the presnce of strong light (photo-oxidation), (ii) Oxygen is a strong quencher of excited state of chlorophyll. Oxygen competes with CO_2 for reducing power. It converts RuBP-carboxylase to RuBP-oxygenase. At very high oxygen concentration, the rate of photosynthesis begins to decline in all plants. This phenomenon is referred to as Warburg effect.

31. (c) PS I is involved in both cyclic and non-cyclic photophosphorylation. PS II is involved only in non-cyclic photophosphorylation. PS II is present in the appressed (linner) part of grana thylakoids. PS I is located in the non-appresed (outer) part of grana thylakoids as well as stroma thylakoids.

32. (d) In cyclic photophosphorylation, only PS–I is involved.

33. (a) In Calvin cycle, three molecules of CO_2 will require 3 x 3 = 9 ATP and 2 x 3 = 6 $NADPH_2$.

34. (c) In photosynthesis, light energy trapped by chlorophyll is used to excite electrons in the chlorophyll. (An electron extracted from water by photolysis fills the electron hole.) The excited electrons are then transferred through the electron transport chain in the thylakoid membrane to $NADP^+$, forming NADPH in the stroma.

35. (b) The key compound of C-3 cycle or Calvin cycle is 3-PGAL as it is starting point for many other metabolic pathways in the plant.

36. (d) Photosynthesis is the process by which plants manufacture food. This occurs when CO_2 combines with ribulose 1,5-bisphosphate (RuBP) to form the products of photosynthesis.

37. (d) **38. (d)** **39. (c)** **40. (b)** **41. (b)**
42. (a) **43. (c)** **44. (a)** **45. (a)**

DPP /CB14

1. (b) During aerobic respiration, oxygen is consumed and CO_2 is released. R.Q is defined as ratio of volume of CO_2 released and O_2 consumed by the respiratory substrate.

$$\text{R.Q.} = \frac{\text{Volume of } CO_2}{\text{Volume of } O_2}$$

2. (b) As a result of glycolysis, one molecule of glucose is broken down to two molecules of pyruvate. During glycolysis, 4 molecules of ATP are produced but 2 molecules of ATP are consumed in the activation of glucose molecule. Therefore, there is a net gain of 2 molecules of ATP.

3. (d) The end product of glycolysis is pyruvate. It enters mitochondria and is oxidatively decarboxylated to acetyl CoA before entering into Krebs cycle.

4. (c) Mesosomes are the invaginations of the plasma membrane that can form into vesicles. They are found to be present in both gram-positive and gram-negative bacteria. Mesosomes may play a role in cell wall formation during cell division and/or chromosome replication and distribution and/or electron transfer systems of respiration.

5. (d) Terminal cytochorome is cyt a_3. cyt a_3 posseses two copper centers. It helps in transfer of electrons to oxygen.

6. (c)

7. (d) Glycolysis is a reductive process in which glucose is broken down in the absence of oxygen within the cytoplasm of the cell. It forms 2 pyruvate molecules, 2 net ATP molecules, 2 $NADH_2$ molecules.

8. (d) In Kreb's cycle, the FAD participates as electron acceptor during the conversion of succinic acid to fumaric acid.

9. (d) **10. (a)** **11. (a)** **12. (a)** **13. (d)**
14. (d) **15. (d)** **16. (b)** **17. (c)** **18. (b)**
19. (b) **20. (a)** **21. (b)** **22. (b)** **23. (d)**

24. (c) Muscle fatigue is the reduction in force of contraction of a muscle after prolonged stimulation. In the absence of oxygen, skeletal muscle of human beings can contract for a short time, but it gets fatigued soon. This is due to the fact that in the absence of oxygen, products of glycolysis mainly lactic acid is not disposed off and accumulates in the muscles.
This leads to muscle fatigue and pain in the muscles. A muscle gets fatigued sooner after a strenuous exercise than after a mild exercise. Faster breathing for sometime after a strenuous exercise supplies extra oxygen, disposes off excess lactic acid and muscle fatigue disappears.

25. (b)

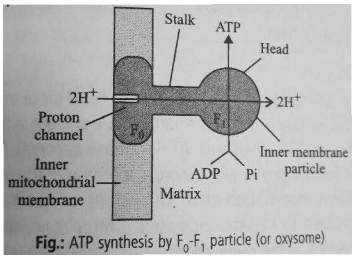


Fig.: ATP synthesis by F_0-F_1 particle (or oxysome)

26. (a) Under normal circumstances, the cell must have sodium pumps (Na^+/K^+ ATPase) which actively transport ATP into the cell. When KCN is added, the carriers are destroyed, thus ATP can enter freely.

27. (c) Since oxygen will not participate, the Pasteur effect will not take place.

28. (d) During Krebs cycle fumarate is formed from succinate and hence, synthesis of fumarate is blocked.

29. (a) Substrate-level-phosphorylation means synthesis of ATP by utilizing energy released directly by the substrates. In glycolysis, there are two steps in which ATP is synthesized. In Krebs cycle, there is only one step where GTP is synthesized when succinyl CoA is converted to succinic acid.

30. (c) Mitochondria oxidize not only carbohy drates but also the products of fats i.e. fatty-acids through acetyl CoA and glycerol through phosphoglyceraldehyde.

31. (b) Yeast causes alcoholic fermentation without using oxygen and hence depletion of oxygen has no effect on the metabolism or growth of yeast cells.

32. (c) When oxygen is available $NADH_2$ produced in EMP-Krebs cycle pathway is released in the form of NAD. When there is shortage of oxygen NAD is not available and NADP takes up its place.

33. (d)

34. (d) ATP molecules from ADP are generated maximum in electron transport chain.

35. (b) 12 kcal of energy present in one molecule of ATP & on oxidation of one mole of glucose into CO_2 and H_2O energy released in 686 kcal. So no. of ATP which can store this energy would be = 57.1 = 57 ATPs.

36. (c) Succinate:ubiquinone oxidoreductase, also known in mitochondria as Complex II, provides a link between the citric acid cycle and the membrane-bound electron-transport system. The membrane extrinsic, water-soluble domain, known as succinate dehydrogenase (SDH), contains the fumarate/succinate active site with a covalently bound FAD group and three iron-sulfur clusters: $[2Fe\text{-}2S]^2$ +/1+, $[4Fe\text{-}4S]^2$+/1+, and $[3Fe\text{-}4S]^1$ +/0. The enzyme catalyzes the interconversion of fumarate and succinate, and is closely related to fumarate reductase.

37. (d) Glycolysis takes place in all body cells and is of two types-
(a) Anaerobic glycolysis-From glycogen or glucose to lactic acid in muscles.
(b) Aerobic glycolysis- From glycogen or glucose to pyruvic acid (all cells of body).

38. (d)

39. (b) One of the functions of the electron transport chain and the conversion of pyruvate to lactate is the regeneration of NAD from reduced NAD. NAD is needed in glycolysis.

40. (d) ATP formation occurs both at 2, where glyceraldehyde-3-phosphate is converted to pyruvate; and at 5, where the six-carbon compound, citrate, releases water and CO_2 in the Krebs cycle.

41. (a) $FADH_2$ is produced during the formation of fumaric acid from succinic acid in the kreb's cycle of aerobic respiration.

42. (d) The oxygen obtained from cellular respiration combines with the hydrogen obtained from the oxidation of organic molecules to form water.

43. (d) Fats make more electrons available to the electron transport system and more hydrogen ions available for chemiosmosis.

44. (c)

45. (c) Primary respiratory substrate is carbohydrate and secondary respiratory substrate is fat.

DPP /CB15

1. (d) Long day plants undergo flowering after receiving light above a critical day length. *e.g.* spinach, sugarbeet. Short day plants flower only when they receive light below a critical day length, *e.g. Glycine max*, tobacco.

2. (d) The hormone, which controls cell division and cell differentiation, is cytokinin. Both the auxin and gibberellins cause elongation of cell and plants.

3. (d) Long-day plants usually flower in the spring or early summer; they flower only if the light periods are longer than a critical length, which is usually 9-16 hours. For example, wheat plants flower only when light periods exceed fourteen hours.

4. (c)

5. (c) Abscisic acid (ABA), also known as abscisin II and dormin, is a plant hormone. It functions as many plant developmental processes, including bud dormancy. Abscisic acid is a derivative of carotenoids. It was called "abscisin II" originally because it was thought to play a major role in abscission of fruits. At about the same time another group was calling it "dormin" because they thought it had a major role in bud dormancy. The name abscisic acid (ABA) was coined by a compromise between the two groups.

6. (c) Differentiation of root is controlled by high auxin concentration. in tissue culture auxin concentration is made high to promote rooting.

7. (c) **8. (c)** **9. (b)** **10. (a)** **11. (c)**

12. (b)

13. (d) Parthenocarpy refers the development of fruits without fertilization. Such fruits are seedless but otherwise normal in appearance, e.g. banana, pineapple etc. The auxins (IAA, IBA, 2, 4-D) are applied in low concentration in a lanolin paste to the stigma of flower to induce parthenocarpy.

14. (c) **15. (a)**

16. (b) Cytokinin are usually amino purine so they resemble nucleic acids in structural aspects.

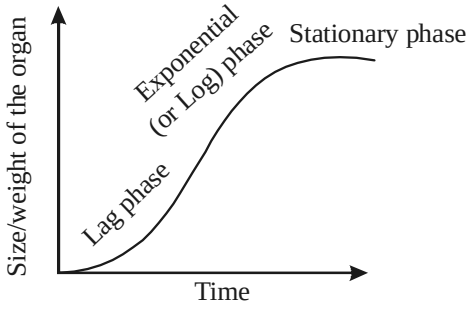
17. (a) Natural auxin are naturally occurring auxin plant hormones which are called phytohormones. Eg. IAA and IBB. These are synthesized in shoot apices, leaf primordial and developing seeds from tryptophan. Some of the important synthetic auxins are 2, 4-D; 2, 4, 5-T (2, 4, 5- trichlorophenoxy acetic acid).

18. (c) 2, 4-Dichlorophenoxy acetic acid is used for causing defoliation of forest trees.
2, 4-D or 2, 4 dichlorophenoxy acetic acid is an auxin hormone. It stimulates the growth activities of the cells of the root due to which roots get destroyed and thus plants finally destroys. 2, 4-D is used as a defoliant for broad leaved dicots.

19. (d) **20. (a)** **21. (c)** **22. (d)** **23. (b)**

24. (c) Geometric growth is quite common in unicellular organisms when growth is nutrient rich medium. Here, every cell divides. The daughter cells grow and divide, the grand daughter cells repeat the process and so on. Number of cells in initially small so that initial growth is slow. Later on, there is rapid growth at exponential rate (log or exponential growth).

Sigmoid Growth Curve : Geometric growth cannot be sustained for long. Limited nutrient availability slows down the growth. It leads to stationary phase. Plotting the growth against time gives a typical sigmoid or S-curve.
The exponential growth can be expressed as
$W1 = W_0e^{rt.}$
where W_1 = final size (weight, height, number etc.)
W_0 = initial size at the beginning of the period
r = growth rate
t = time of growth
e = base of natural logarithms



25. (a) Low temperature required for vernalization is usually 0—5°C. In nature, the plants requiring vernalization are commonly biennials (e.g., cabbage, sugarbeet, carrot), which complete their life cycle in two years. They germinate and grow vegetatively in the first year and produce flowers in the second year of growth. These plants fulfill their cold requirement during winters. However, such biennial plants can be made to flower in one growing season by providing low temperature treatment (i.e., 0—5°C temperature) to young plants or moistened seeds.

26. (c) The pulse of red light converts P_r to P_{fr}. Subsequent pulses of far-red light stimulate changes that lead to chlorophyll synthesis.

27. (d) Mechanical abrasion, leaching of inhibitors by water, and exposure to fire may all trigger germination, but actual germination cannot begin until the seed imbibes water.

28. (b) Ethylene gas promotes senescence and is one of the by products of burning your gas grill. You should move your grill or your camellia bush.

29. (b) Less of chlorophyll and degeneration of proteins are the two important symptoms of senescence. Cytokinins delay these processes and, thus the senescence is also delayed. This effect of cytokinin is known as Richmond-Lang effect.

30. (d) Receptors receive environmental cues and trigger hormone release or a signal transduction pathway that involves hormones. The signal alters gene expression by altering genes which are transcribed and translated. Cellular response depends on expression of those genes.

31. (b) The ratios of cytokinins to auxins control cell differentiation in plant tissue culture. When both are present in relatively equal quantities, cells divide but do not differentiate. If there is more of cytokinin than auxin, shoot buds develop from a callus. If there is relatively more auxin than cytokinins, roots develop. Thus proportion of these two hormones control organ formation in callus tissues. Abscissic acid (ABA) is a naturally occurring growth inhibitor.

32. (c) Cryptochromes respond to blue and ultraviolet light.

33. (d) The curvature induced in plant organs in response to the unidirectional light is called photoropism.

34. (a) The first naturally occuring auxin was isolated by Kogl and Haagen-Smit (1931) from human urine. It was identified as auxin-a (auxentriolic acid). Later, in 1934 Kogl, Haagen-Smit and Erxleben obtained another auxin called auxin-b (auxenolonic acid) from corn germ oil (extracted from germinating corn seeds).

35. (b) Altering the plasticity allows for permanent changes in cell wall shape. The cell wall must increase in size in order for cell growth to occur.

36. (b) Dwarf strains were genetically unable to produce gibberellin, so additional fertilizers would have no effect.

37. (a) Paratonic movements are induced by external stimuli.

38. (d) **39. (a)** **40. (d)** **41. (c)** **42. (a)**

43. (c) Prunning of plants promotes branching, because the axillary buds get sensitized to cytokinin.

44. (c) **45. (d)**

DPP /CB16

1. (b) Spleen (also known as blood bank and graveyard of RBCs) is a dark, purple gland present in the left side of abdomen against the stomach. It is internally made up of white pulp and red pulp. Its main functions are storage of blood and break down of old and senescent RBCs.

2. (a) Vitamins are accessory food factors required in small amount for growth and metabolism. Vitamins are either water soluble $\rightarrow$ B. complex and vit.C or fat soluble $\rightarrow$ vit. A, D and K.

3. (c) **4. (d)**

5. (b) Premolar and molar are lophodont teeths. Lophodont teeth with the cusps elongated to form narrow ridges. The molars in elephants and horses have cusps fused by means of intermediate masses of dentine to form ridges or lophs.

6. (d)

7. (c) Continued consumption of fat rich diet causes hypercholesterolemia. Hypercholesterolemia is the presence of high levels of cholesterol in the blood. High cholesterol raises risk for heart disease, heart attack, and stroke. Kidney stones are solid mass made up of tiny crystals. There are different types of kidney stones. The exact cause depends on the type of stone like, calcium stones, uric acid stone *etc*. Vitamin A toxicity or hypervitaminosis A is having too much of vitamin A in the body. Ketonuria is condition in which ketone bodies are present in urine. Body productes excess ketone bodies as an alternate source of energy during starvation or diabetes mellitus (type 1).

8. (a) Fat is mainly digested by pancreatic lipase while protein is digested by enzymes in pancreatic juice, intestinal juice and stomach.

9. (c) Beri-beri is a deficiency disease caused by the lack of vitamin B_1 (Thiamine) in the diet. The deficiency of riboflavin (Vit.B_2) causes ariboflavinosis. Scurvy is the result of lack of vitamin C in the diet. Deficiency of calciferol (vitamin D) in the diet causes rickets in children and osteomalacia in adults.

10. (a) Oxyntic cells or Parietal cells, are the stomach epithelium cells that secrete gastric acid and intrinsic factor. These cells secrete hydrochloric acid (HCl) which makes the gastric juice acidic (pH = 2.0-3.0).
Alpha cells of islets of Langerhans secretes glucagon hormone which increase the glucose level in the blood by converting glycogen to glucose in liver cells. Kupffer's cells are specialized cells in the liver that destroy bacteria, foreign proteins, and worn-out blood cells. Sebaceous glands and microscopic glands in the skin that secrete an oily/ waxy matter (called sebum) to lubricate the skin and hair of mammals.

11. (c) Kwashiorkor and Beri-Beri are deficiency diseases which occur mostly in children. Kwashiorkar occurs due to deficiency of protein and Beri-Beri due to deficiency of vit-B_1 (Thiamine).

12. (d) Colostrum (also known as beesting or first milk) is a form of milk produced by the mammary glands in late pregnancy and the few days after giving birth. Human and bovine colostrums are thick, sticky and yellowish. In humans, it has high concentrations of nutrients and antibodies, but it is small in quantity.
Colostrum is high in carbohydrates, high in protein, high in antibodies, and low in fat (as human new borns may find fat difficult to digest). Newborns have very small digestive systems, and colostrum delivers its nutrients in a very concentrated low-volume form. It has a mild laxative effect, encouraging the passing of the baby's first stool, which is called meconium. This clears excess bilirubin, a waste product of dead red blood cells which is produced in large quantities at birth due to blood volume reduction, from the infant's body and helps to prevent jaundice.

13. (b) Long term intake of alcohol causes damage to liver which is known as cirrhosis of liver with continued alcohol intake, there is destruction of hepatocytes and fibroblasts (cell which form fibres) and stimulates of collagen protein formation.

14. (d) 15. (d) 16. (b) 17. (b) 18. (d) 19. (a) 20. (d) 21. (b)

22. (a) The chylomicrons are formed inside enterocytes and are absorbed in lacteals.

23. (a) The caecum is a pouch-like portion of the large intestine which hosts some symbiotic micro-organism. The caecum absorbs water and salts from undigested foods before they continue on to the large intestine.

24. (b) 25. (a)

26. (d) In the small intestine, pancreatic juice containing an enzyme, α-amylase acts on starch and converts it into dissacharide, maltose and isomaltose and 'limit dextrins.

$$\text{Starch} \xrightarrow[\alpha-\text{aMylase}]{\text{Pancreatic}} \text{Maltose} + \text{Isomaltose} + \text{'Limit' dextrins}$$

27. (a) Fructose is generally absorbed by facilitated transport. The digestive wastes, solidified into coherent faeces in the rectum initiate a neural reflex causing an urge or desire for its removal.

28. (c) Many of the water-soluble vitamins play a vital role in enzyme function.

29. (d) The pancreas produces a mumber of important digestive enzymes, without which digestion and nutrient absorption are greatly hampered.

30. (c) A gastrovascular cavity has a single opening.

31. (d) Enzymes that digest proteins, lipids, and carbohydrates all function in the small intestine.

32. (c) Essential amino acids must be acquired through diet because an animal cannot directly synthesize all of the amino acids needed for protein

33. (d) The stomach is protected from digestive enzymes and low pH by the neutralizing, buffering, and coating mucus secreted over its inner surface.

34. (a) The small intestines are the site for the majority of digestion in humans.

35. (c) The large intestine is the site of water and ion absorption. The large population of bacteria in the large intestine contributes vitamins that are useful to the host.

36. (b) The membranes of the digestive tract are, from the inside to the outside: mucosa, submucosa, circular and longitudinal muscles, serosa.

37. (c) the stomach stores food (and performs some digestion too) before passing it on to the intestines. The small intestine (midgut) finishes tint digestion and carries out most of the nutrient absorption, while the large intestine (hindgut) reabsorbs water and ions.

38. (d) Insulin increases the rate of glucose uptake from the blood into the muscle cells by increasing the number of glucose transporters in the plasma membrane.

39. (a) The liver produces bile salts and add to the bile pigments bilirubin from the breakdown of red blood cells. The bile pigments are purely excretory.

40. (c)

41. (d) Generally, fatty acids upto a chain length of 10 carbon atoms are primarily absorbed through the blood caillaries, but those with higher chain length through lymphatic route (lymph vessels).

42. (c) Mammals may drink water and also get it from oxidation of glucose.

43. (b) Because saliva converts starch into maltose.

44. (a) Anxiety and eating spicy food together in normal healthy man can lead to indigestion which is difficulty in digestion.

45. (a) Young infant may be feeding entirely on mother's milk which is white in colour but the stools which the infant passes out is quite yellowish because bile pigments passed through bile juice. Bile pigments are any of several coloured compounds derived from porphyrin that are found in bile; principally bilirubin and biliverdin. Bile pigment is produced regularly when old red blood cells are broken down, mainly by the spleen. In some blood-disorders where the red cells are destroyed, more bile pigment is produced.

DPP /CB17

1. (a) 70% to 75% CO_2 is transported as primary buffer of the blood bicarbonate ion (HCO_3) in blood plasma. When CO_2 diffuses from tissues into blood then it is acted upon by the enzyme carbonic anhydrase.

2. (a) A large portion of oxygen is left unused in the human blood even after its uptake by the body tissues. This O_2 acts as a reserve during muscular exercise.

3. (a) It is the relationship between the percentage saturation of haemoglobin (by volume) in the blood and the oxygen tension (in partial tension) pO_2 of the blood.
It is usually a sigmoid plot. Haemoglobin molecules can bind up to four oxygen molecules in a reversible way. The shape of the curve results from the interaction of bound oxygen molecules with incoming molecules. The binding of the first molecule is difficult. However, this facilitates the binding of the second and third molecules, and it is only when the fourth molecule is to be bound that the difficulty increases, partly as a result of crowding of the haemoglobin molecule, partly as a natural tendency of oxygen to dissociate.

4. (d) Brain is the most vital organ. It stops functioning in the absence of O_2.

5. (d) When the CO_2 concentration in blood increases, breathing becomes faster and deeper. As CO_2 levels increase, patients exhibit a reduction in overall level of consciousness as well as respiratory effort. Severe increase in CO_2 levels can lead to respiratory arrest.

6. (c) CO_2 enters RBC and reacts with water to form carbonic acid. Carbonic acid dissociates to form bicarbonate and hydrogen ions. Some bicarbonate ions are transported in erythrocytes while some diffuse into the blood plasma. Exit of bicarbonate ions change the ionic balance between the plasma and erythrocytes. To restore this balance chloride ions diffuse from plasma into erythrocytes. Due to this, the pH of blood is maintained.

7. (a)

8. (c) The maximum volume of air a person can breath in after a forced expiration or the maximum volume of air a person can breathe out after a forced inspiration is called vital capacity (VC). This includes tidal volume, inspiratory reserve volume and expiratory reserve volume. (TV + IRV + ERV). VC varies from 3400 ml – 4800 mL, depending upon age, sex and height of the individual.

9. (b) **10. (d)**

11. (c) Emphysema is lung condition that causes shortness of breath due to damage of air sacs in the lungs (alvcoli). The main cause of emphysema is a long-term exposure to air-borne irritants including tobacco smoke, air pollution, dust.

12. (b) **13. (d)** **14. (b)** **15. (d)** **16. (d)**

17. (a) **18. (a)**

19. (c) When the external intercostal muscles and diaphragm relax, the ribs move downward and inward and diaphragm becomes convex (dome shaped), thus decreasing the volume of thoracic cavity and increasing the pressure inside as compared to the atmospheric pressure outside. This will cause the air to move out (expiration).

20. (d) Pulmonary, CO_2 is found to be lower than cutaneous O_2 at all temperatures. Statement A is a wrong answer. This is because at 5^oC, pulmonary O_2 is lower than cutaneous O_2, although as the temperature increases, the reverse becomes true.

21. (c) Myoglobin has an affinity for oxygen. It is present in the muscles. As oxygen levels reduce, myoglobin would release the stored oxygen to keep the muscles working.

22. (a) This decreases the size of the thoracic cavity, which increases the pressure within the thoracic cavity, forcing air out of the lungs.

23. (d) Debris normally gets trapped in mucus lining the respiratory passage ways. This mucus is then swept up and away from the lungs by the action of cilia.

24. (d) Myoglobin has the greatest affinity for oxygen and does not unload the oxygen until very low partial pressures of oxygen (below 20 mmHg). Foetal haemoglobin has a higher affinity for oxygen than adult haemoglobin, thus facilitating the transfer of oxygen from maternal haemoglobin to fetal, haemoglobin at the placenta. When respiration is occurring a fast rate, more oxygen is needed. High levels of respiration are associated with high levels of carbon dioxide, hence the affinity of haemoglobin for oxygen decreases at higher carbon dioxide partial pressures so that oxygen can be released to respiring tissues.

25. (a) Inspiration in the mammalian lung occurs by means of negative pressure produced by contraction of the diaphragm. Thus, the pressure in the lungs falls below atmospheric pressure.

26. (d) The Bohr effect describes the action of pH on the oxygen-binding curve. Decreases in pH result in a net right shift of the entire oxygen equilibrium curve.

27. (d) Movement of O_2 and CO_2 from the blood to the tissues always occurs by diffusion of O_2 and CO_2 down their partial pressure gradients.

28. (d) This mechanism serves a very important cleansing role for the mammalian respiratory system.

29. (d) A left shift in the oxygen-binding curve means that the pigment operates at lower PO_2 values.

30. (d) Actively respiring tissues require more oxygen. They are also associated with high partial pressures of carbon dioxide since it is a product of respiration. The curves show that oxygen would be more readily released at higher partial pressures of carbon dioxide, i.e. at active tissues.

31. (c) When the chest expands, stretch receptors in the lungs reflexly excite the expiratory center in the medulla which tends to produce expiration. Partial exhalation lessens the intensity of this reflex, allowing breath to be held for a longer time. Exhalation does not change the blood CO_2 concentration unless fresh air (low in CO_2) is brought into the lungs, allowing more CO_2 to diffuse out of the blood.

32. (b) Thin layer of water on the inner surface of alveoli serves to contract the alveoli and makes them behave like unfilled balloons that resist inflation. This would mean tremendous effort to inhale and expand the alveoli and therefore to overcome this, cells of the alveoli secrete pulmonary surfactant to decrease the surface tension of water lining the alveoli.

33. (d) Gas is brought into the lungs when the negative pressure exists between the lungs and the rest of the chest. This negative intrapleural pressure is aided to occur by all the choices mentioned.

34. (c) **35. (d)**

36. (c) Changes in pH due to the accumulation of acidic metabolites resulting from increased cell activity are the basis of the Bohr effect.

37. (d)

38. (d) The hyoid is a bone of the skeletal system that supports the larynx and tongue.

39. (c) The alveoli do not contain "air" with 20.9% O_2 because incoming air is mixed with air left in the "dead space" of the trachea and bronchi that has had some of the O_2 removed by the lungs.

40. (c) Water breathing is more difficult than air breathing because the higher density of water makes it more expensive to move across the respiratory surfaces than air, it has less oxygen than air, and the oxygen content is very dependent on the temperature of the water. CO_2 however, dissolves easily into water and is easy to get rid of.

41. (d) All of the listed choices have larger volume than the resting tidal volume.

42. (a) Myoglobin has only one haem group and there can be no co-operative binding, hence the shape of the dissociation curve is hyperbolic rather than sigmoidal. Also, myoglobin has a very high affinity for oxygen and does not release oxygen until a very low oxygen tension.

43. (b)

44. (a) During the transport of CO_2 through the blood, bicarbonate ions diffuse out of RBCs while chloride ions from plasma enter the RBCs to maintain ionic equilibrium. This is called chloride shift.

45. (b) The total volume of air that can be expelled from the lungs after maximum inspiration and then expiring to the maximum is known as the vital capacity. The volume of air that remains inside lungs at the end of maximum forceful expiration is the residual volume. Expiratory reserve volume is the maximum extra volume of air that can be expired by forceful expiration after a normal tidal expiration. Total lung capacity is the maximum volume of air that can be contained in the lungs after maximum inspiration.

DPP /CB18

1. (a)

2. (c)

3. (a) Lubb sound is caused partly by the closure of the bicuspid and tricuspid valves and partly by the contraction of the muscles in the ventricles. Lubb is the first heart sound.

4. (b) Rh factor was discovered by Karl Landsteiner. A child of Rh^+ man will be Rh^+ whether the mother is Rh^+ or Rh^-. If the mother is Rh^+ then there will be no problem but if mother is Rh^- so when the blood of Rh^+ child (in womb)

mixes with the blood of Rh^- mother then some antibodies in mother's blood are formed against Rh^+ factor which coagulate the womb blood causing death. If birth takes place then there is a possibility of child death in early years. This in known as erythroblastosis foetalis. In most cases the Ist pregnancy may succeed but after that it fails.

5. (c)

6. (c) Peak P-causes diastolic phase in ventricle while R-Peak causes systole in ventricle means diastolic and systolic phases represented by P & R.

7. (c) Sino-Auricular node (SA node) present in the walls of right auricle has a myogenic initiation of heartbeat in a regular fashion and controls the pace of heartbeat called pacemaker.

8. (c)

9. (d) Haemoglobin has 250 times more affinity for CO as compared to oxygen. Hb readily combines with CO, forming carboxyhaemoglobin (COHb), COHb interferes with the transport of oxygen.

10. (c) An adult healthy human has average systolic and diastolic blood pressure as given below :

$$\text{B.P.} = \frac{\text{Systolic}}{\text{Diastolic}} = \frac{120 \text{ mm Hg}}{80 \text{ mm Hg}}$$

11. (b) Blood group A – Antigen-A & Antibody 'b' or Anti A or a.
Blood group B – Antigen-B & antibody a or Anti B or b.
Blood group AB – Antigen-A & B and no antibody.
Blood group O – No antigen & Antibodies a & b both.

12. (d) The number of blood platelets per cubic mm in human blood is 3 lacs while WBCs are 5000/cubic mm of blood. Veins are as complex as the arteries. Veins and arteries both are types of blood vessels. Arteries carry blood from heart to different organs while vein carries blood from different organs to heart. At any given time in a healthy human, the blood amount is same in both, as the circulation of blood never stops.
Blood consists of two parts:
The **plasma** (water, proteins, inorganic salts and other elements) constitutes 55-60% of blood while **cellular** part constitutes 40-45% of total blood. WBC are produced in red bone marrow, lymph nodes and sometimes even in liver and spleen.

13. (a) High proportion of cholesterol in blood leads to deposition of cholesterol on the walls of blood vessels. This causes the arteries to lose their elasticity and get stiffened. This is called arteriosclerosis or hardening of arteries.

14. (d)

15. (b) 'Bundle of His' are a typical cardiac muscle fibres, connecting the atria with ventricle.

16. (d) **17. (d)** **18. (a)** **19. (c)** **20. (d)**
21. (d) **22. (c)** **23. (a)** **24. (a)** **25. (a)**
26. (d) **27. (b)** **28. (a)**

29. (a) The degree of oxygenation of blood markedly affects the amount of CO_2 transported in blood. The lower the pO_2 and the haemoglobin saturation with O_2, the more the CO_2 that can be carried in the blood. This phenomenon, is called the Haldane effect. It depicts the greater ability of reduced haemoglobin to form carbaminohaemoglobin and to buffer H^+ by combining with it. In the pulmonary circulation, uptake of O_2 facilitates the release of CO_2. As haemoglobin becomes saturated with O_2, the hydrogen ions released combine with HCO_3^-, helping to unload CO_2 from the pulmonary blood. The Haldane effect is quantitatively more important in promoting O_2 transport than the Bohr effect in promoting O_2 transport. It results from the simple fact that combination of O_2 with haemoglobin causes the haemoglobin (oxyhaemoglobin) to become a stronger acid. This in turn displaces CO_2 from the blood.

30. (d) Christmas factor (factor IX) is a plasma thromboplastin component i.e. a thromboplastin activator present in blood plasma. Its deficiency causes congenital disease called hemophilia B (also called Christmas disease).

31. (c) Veins bring blood from different body parts to the heart. The flow of blood in veins is not so fast because the blood in veins is under low pressure. Veins possess valves which prevent backward flow of blood.

32. (d) Cardiac output = Stroke volume × heart beats per minute

$$\therefore \text{ Stroke volume} = \frac{\text{Cardiac output}}{\text{Heart beats per minute}}$$

$$= \frac{5250}{75} = 70 \text{ ml}$$

33. (a) Heart valves only permit unidirectional flow of blood.

34. (b)

35. (c) The left ventricle pumps blood into the aorta.

36. (a) Contraction of the ventricle produces pressure in the human circulatory system. Blood leaves the ventricles and then immediately enters the arteries moving away from the heart. Blood pressure will have its highest recording in these arteries.

37. (c) The small diameter of capillaries offers great resistance to blood flow. This slows the blood to a speed at which nutrient and gas exchange with neighboring cells is more efficient.

38. (b) The atrium has thinner walls and generates lower pressures than the ventricles.

39. (a)

40. (c) The left ventricle generates a greater pressure in the blood flowing to the systemic circuit than the right ventricle with blood flowing to the pulmonary circuit.

41. (c) The AV node delays the ventricular depolarization relative to atrial depolarization, so atrial contraction occurs before ventricular contraction. The Purkinje fibers transmit the cardiac impulse to very small localized groups of ventricular fibers.

42. (d)

43. (a) Presence of calcium will remove heparin - blood anticoagulant and will promote blood clotting. Sodium oxalate and heparin containing test tubes will not allow the blood to clot.

44. (a) Blood serum is liquid minus clotting elements of pale yellow colour. It does not have fibrinogen and other clotting materials. It does not take part in blood clotting.

45. (a) Folic Acid (Cyanocobalamine vit. B_{12}) works in the formation and maturation of RBCs. In the deficiency of this RBCs formation decreases and the formed RBCs will not mature i.e. they will not loose the nucleus and hence remain nucleated and lack haemoglobin. Such RBCs cannot carry oxygen & person suffers from anaemia. Supplementing his diet with folic acid and cobalamine will lead to the increased formation and proper maturation of enucleated RBCs with haemoglobin and eliminate anaemia.

DPP /CB19

1. (c) Liver is the primary site of detoxification and elimination of body wastes and poisons. Liver detoxifies endotoxins, *e.g.* toxic NH_3 combined with CO_2 to form less toxic urea. It also detoxifies alcohol and convert them to acetaldehyde and then harmless acetyl CoA.

2. (d) Renin (also called rennet or chymosin) is an coagulating enzyme produced from stomach of human body. It catalyzes the coagulation of milk by converting milk with

soluble protein caesin into insoluble semi fluid calcium paracaesinate. This is called curdling of milk. Rennin produced in the infants immediately after birth. As the child grows, rennin production goes down and is replaced by pepsin digestive enzymes.
Renin is an enzyme which acts as hormone secreted by juxtaglomerular cells. It converts angiotensinogen into angiotensin.

3. (b) Nephron is the excretory unit of human excretory system. Each nephron has a Bowman's Capsule, a Proximal Convoluted Tubule (PCT), Loop of Henle (Descending & Ascending limbs) and Distal Convoluted Tubule (DCT) which then enter into collecting duct.

4. (d)

5. (b) Thermoregulation is the ability of an organism to keep its body temperature within certain boundaries, even when temperature surrounding is very different. In humans, sweating is primarily a means of thermoregulation.

6. (c) Due to a long hunger strike and survival on water, a person will have less urea in his urine because urea comes to kidney as a waste product from liver which is formed after the breakdown of protein fat, carbohydrate during hunger. It is not synthesised but the synthesised ones are catabolised.

7. (c)

8. (b) It is named after its discoverer, F. G. J. Henle. In the kidney, the loop of Henle is the portion of the nephron that leads from the proximal convoluted tubule to the distal convoluted tubule. The loop has a hairpin bend in the renal medulla. The main function of this structure is to reabsorb water and ions from the urine. To do this, it uses a countercurrent multiplier mechanism in the medulla.

9. (a) **10. (d)** **11. (c)** **12. (b)** **13. (d)**

14. (a) Glomerular podocytes are highly specialized cells with a complex cytoarchitecture plays a major role in establishing the selective permeability of glomerular filtration barrier.

15. (c) Haematuria is the presence of blood cells in urine.

16. (c) **17. (c)**

18. (a) ANF stimulates the loss of sodium in urine while aldosterone absorbs sodium from glomerular filtrate.

19. (b) **20. (d)** **21 (d)** **22. (b)**

23 (a) Kangaroo rat lives in desert, therefore, it needs to conserve water in the body. In kangaroo rat, loop of Henle is significantly longer as it descends further into the medulla and produces a higher concentration gradient in the surrounding tissue so as to produce urine which is 18 times concentrated than that of their blood. This gradient allows more water to diffuse into the surrounding tissues to be reabsorbed.

24. (b) Dialysis is of two types : haemodialysis and peritoneal dialysis. Peritoneal dialysis uses a natural filter inside the body i.e. peritoneal membrane to remove wastes and extra fluid from the body. The dialysis fluid fills the belly and pulls out wastes and extra fluid from the body. Blood is not removed from the body as in the case of haemodialysis.

25. (b) If the walls of the collecting duct are water-permeable, water leaves the ducts to pass into the hyperosmotic surrounding and concentrated urine is produced. Thus, when there is insufficient ADH, less water is reabsorbed and more dilute urine is produced in copious amounts.

26. (c) Ectotherms on poikilothermic animals are cold-blooded animals whose body temperature is dependent upon their environment.

27. (c) A and B involve ultrafiltration.
In the proximal convoluted tubules, the mitochondria provide energy for active transport. The cells here are adapted for reabsorption. The amino acids diffuse into the cells and are actively transported to the intercellular spaces, where they diffuse into the surrounding capillaries.

28. (a) The removal of urea and excess ions occurs by diffusion from the blood in the abdominal capillaries to the dialysis fluid, down a concentration gradient.

29. (d) This is the correct flow of urine after it leaves the kidney.

30. (b) About 1 percent of the filtrate is excreted as urine, so about 1.5 litres of the original 150 litres would be urinated.

31. (c) Antidiuretic hormone acts on the collecting ducts by increasing the permeability to water. Antidiuretic hormone secretion is stimulated by a decrease in blood pressure.

32. (b) Reabsorption returns substances to the blood, secretion moves substances from blood into the kidney tubules.

33. (a) The route of water and solutes through the nephron from the glomerulus, to Bowman's capsule, to proximal tubule, to loop of Henle, to distal tubule, to collecting ducts.

34. (d) Glucose and amino acids found in the filtrate are reabsorbed.

35. (a) The proximal tubule is the site of active transport of Na^+ out of the tubule. Na^+ also moves out of the tubule at the ascending limb of the loop of Henle, but this is a passive transport with Cl^- being actively transported out.

36. (a) Red blood cells are too large to be filtered out of the blood at the glomerulus and thus will not be found in the filtrate.

37. (b) Glucose is 100% reabsorbed and thus a healthy person will excrete no glucose in the urine. Sodium and water are usually over 99% reabsorbed. Urea is the main excretory product formed as a result of protein breakdown.

38. (b) The sole mechanism for water reabsorption in the renal tubules is by osmosis.

39. (d) A – Adrenal gland – located at the anterior part of kidney, secrete Catecholamines which stimulate glycogen breakdown.

40. (d)

41. (c) Salamander (Amphibia; Caudata) excrete urea by help of kidneys.

42. (c) Normally albumin can't pass out through the filtering pores due to their large size but in some pathological conditions viz. anoxia or heart failure, the filtration membrane becomes damaged and filtering pores enlarge in size, so that serum albumin passes out in the largest amount and appears in the urine.

43. (b) **44. (b)** **45. (c)**

DPP /CB20

1. (c) Movement of Ca^{2+} out in sarcoplasmic reticulum controls the making and breaking of actin and myosin complex actomyosin due to which muscle contraction and relaxation takes place. Albert Szent Gyorgyi worked out biochemical events of muscle contraction.

2. (a) Elbow joint is an example of hinge joint. The elbow is a hinge joint; it can open and close like a door. Hinge joint is a form of diarthrosis (freely movable joint) that allows angular movement in one plane only, increasing or decreasing the angle between the bones e.g. elbow joint, knee joint etc.

3. (b) MRI machine does not show face image of bone and calcium, *e.g*. scapula, canine. It is also not suitable for patients with cardiac pacemakers.

4. (b) Hyoid is a horse shoe shaped bone present in neck between lower law and sound box (larynx). It is not articulated to any bone, but is simply suspended, from temporal bones by means of ligaments. Hyoid provides surface for the attachment of tongue muscles.

5. (b)

6. (d) Ball and socket joint is a type of synovial joint in which two bones are articulated. Shoulder joint is an example of

ball and socket joint in which humerus is joined with pectoral girdle.

7. (a) Actin and tropomyosin are part of thin filaments of skeletal muscle. Tubulin is presents in microtubules. Myosin is muscle protein.

8. (d)

9. (a) The pelvic girdle is formed by two innominate bones consists of three separate bones ilium, ischium and the pubis.

10. (d) The last two pairs *i.e.* 11th and 12th pairs ribs remain free anteriorly, hence, they are called as floating ribs.

11. (d)

12. (d) The sensation of fatigue in the muscles after prolonged strenuous physical work is caused by the accumulation of lactic acid.

13. (d) 14. (c) 15. (c) 16. (c) 17. (a)

18. (c) Troponin is a protein which is found on actin filament and myosin protein is found in myosin filament. Both actin and myosin are complex proteins in striated muscles.
Thymosin is a hormone secreted by the thymus that stimulates development of T-cells. Prolactin is a hormone released by the pituitary gland that stimulates breast development and milk production in women. Rhodopsin, also known as visual purple, is not a hormone. It is a biological pigment in photoreceptor cells of the retina that is responsible for the first events in the perception of light.

19. (a) 20. (d) 21. (a) 22. (a) 23. (a)

24. (a) Smooth muscles are non-straited, unbranched and spindle shaped. Skeletal muscles are unbranched. Cardiac muscles fibres are uni-nucleated.

25. (d) Tarsals, femur, metatarsals and tibia are boned of the legs which are involved in running during chasing the ball by cricket player.

26. (b) Bone is made up of 60&70% inorganic matter and 30&40% organic matter.

27. (a) Hyaline cartilage is most abundant cartilage in body.

28. (b) The ER releases calcium ions only if stimulated by an action potential, which requires acetylcholine to diffuse across the neuromuscular junction.

29. (c) Fine motor control is accomplished by the presence of smaller, more numerous motor units. Each motor unit requires an individual motor neuron.

30. (c) Smooth muscle is found mainly in the walls of hollow organs, such as digestive tract organs and blood vessels. Smooth muscles propel substances through the hollow organ by alternately contracting and relaxing.

31. (b) A hydrostatic skeleton consists of fluid held under pressure in a closed body compartment.

32. (a) Mandible is a large bone constituting the lower jaw.

33. (b) Stapes is one of the three ear ossicles in the middle ear resembling a tiny stirrup. It transmits sound vibrations from the incus to the internal ear.

34. (b) ATP provides energy that is used to detach myosin from actin.

35. (b) Endoskeletons (such as those of mammals) are found inside the body, and exoskeletons (such as those of insects) are found outside the body.

36. (c) In gout, there occurs a defect in uric acid metabolism resulting into its elevated level in blood (hyperuricemia). This is followed by precipitation of excessive uric acid which gets deposited in the joint spaces. These deposited crystals of uric acid causes pain in different bony joints.

37. (b) 38. (c) 39. (d)

40. (a) Glenoid cavity is a shallow concavity on the lateral side of pectoral girdle in which the head of humerus fits making the shoulder joint.

41. (c) 42. (c) 43. (b) 44. (b) 45. (a)

DPP /CB21

1. (b) Afferent nerve fibres – sensory nerve fibres which carry senses from receptors to brain or spinal cord (CNS).
Efferent nerve fibres – motor nerve fibres that carry orders or responses from CNS to effectors (muscles and glands).

2. (a) Hypothalamus contains important nerve centres that controls the body temperature, thirst, hunger, eating, water balance and sexual function.

3. (c) The rods and cones are exceptionally specialized bipolar neurons which have developed some structural features to carry out the transduction of light energy into neuronal signals.

4. (c) The transmission of nerve impulse through synapse requires a chemical neuro transmitter. The most common neurotransmitter is acetylcholine.

5. (b) Alzheimer disease in humans is associated with the deficiency of acetylcholine. Acetylcholine is the neurotransmitter produced by neurons (referred to as cholinergic neurons). Acetylcholine plays a role in skeletal muscle movement, as well as in the regulation of smooth muscle and cardiac muscle. Acetylcholine is synthesized from choline and acetyl coenzyme-A through the action of the enzyme choline acetyltransferase and becomes packaged into membrane-bound vesicles.

6. (c) Conditioned reflexes are acquired reflexes and are dependent on past experiences, training and learning. I.R. Pavlov demonstrated conditioned reflexes in a hungry dog. He called food and salivation in response to it as unconditioned stimulus and sound of bell and salivation in response to bell as conditioned reflexes.

7. (a) The inner layer of the posterior two-thirds of the eyeball consists of a light sensitive layer, called retina that possesses two types of photoreceptors called the rods and the cone cells. Retina reduces the internal reflection, so any damage to it leads to greater internal reflection of light often causing an increase in light sensitivity.

8. (c) Epinephrine or adrenaline, norepinephrine or noradrenaline and acetylchloline are the neurotransmitters. These are released by the nerve fibres to transmit the impulse to the next neurone. Cortisone is not a neurotransmitter.

9. (d) Total sum of physio-electrochemical changes that takes place along the length of nerve fibre is known as nerve impulse.
Change in potential due to stimulation of nerve fibre is called action potential. During propagation of nerve impulse, Na^+ enters inside so (+ve) change is formed inside the membrane. K^+ ions come out.

10. (c) 11. (c) 12. (b)

13. (c) The intensity of movement of basilar fibres regulates the loudness or amplitude of sound.

14. (d) 15. (a) 16. (b)

17. (a) Epinephrine and norepinephrine are secreted by adrenalmedulla in response to stress of any kind and during emergency situations and are called emergency hormones or hormones of flight, or fight.

18. (c) 19. (a) 20. (d) 21. (d) 22. (b)

23. (a)

24. (a) During stress condition, stimulation of the sympathetic nerves to adrenal medulla causes large quantities of adrenaline to be released into the blood circulation and then this hormone is carried to the specific tissues of the body where it produces its effect e.g., increase in heart beat.

25. (b) Tectorial membrane is a gelatinous membrane covering the sensory hair cells in the scala media of cochlea.

26. (b) Once differentiated, nerve cells do not divide as they lack mitotic activity. Lack of mitotic activity indicates that they do not have centrosome.
27. (d) Reflex arcs allow for rapid processing and response.
28. (d) These drugs alter perception of stimuli and work mainly at the axon or the synapse
29. (b) An action potential is a localized electrical event—a membrane depolarization at a specific point of stimulation.
30. (d) An influx of sodium depolarizes the membrane and opens more sodium channels, causing still more depolarization, an example of positive feedback.
31. (c) The embryonic forebrain gives rise to the telencephalon and the diencephalon. The thalamus and the hypothalamus develop from the diencephalon; the cerebral cortex develops from the telencephalon.
32. (c) Since the action potential started in the middle of the axon, rather than at the axon hillock as typically occurs, there is no previous patch of membrane currently undergoing a refractory period. The action potential is thus free to propagate in both directions.
33. (b) Hyperpolarizing neuron B by 15 mV would make its membrane potential –65mV, actually taking it further away from the threshold voltage needed to fire an action potential.
34. (d) The medulla oblongata contains centers that control several visceral functions, such as breathing, heart and blood vessel activity, swallowing, vomiting, and digestion.
35. (d) For an action potential to occur in an axon, the membrane must be depolarized above a certain level. This level is known as the threshold.
36. (d) Electrical synapses join two cells with protein tunnels known as connexons. The junctions that are formed provide for very fast transmission between cells.
37. (c) Atropine is a substance that blocks the inhibitory effects of muscarinic receptors in muscle tissue, especially the heart.
38. (b)
39. (c) Arbor vitae is composed of white matter.
40. (a)
41. (c) The white matter in the CNS consists of tracts that convey sensations from one structure or region to another.
42. (c)
43. (c) The olfactory epithelium lining the superior border of the nasal cavity is innervated by the olfactory (first cranial) nerve.
44. (a) These are called the limits of audibility. Actual value is 20 to 20000 cycles/sec.
45. (c)

DPP /CB22

1. (a) Cortisol is secreted by the middle region of adrenal cortex. It increases the blood glucose level (which is anti-insulin effect) by converting proteins & fats into glucose.
2. (b) Pancreas is a gland which is both exocrine and endocrine. Cells of acini are exocrine which secrete enzymes and islet of Langerhans part is endocrine which secretes hormones like insulin, glucagon, *etc*.
3. (b) Hormones are chemical messengers formed by endocrine cells. Chemically hormones are of the following types: Amines– composed of amino group e.g., Melatonin.
Amino acids – eg. thyroxine
Peptides –eg. insulin
Steroids –eg. aldosterone
4. (a) Parathamone is a peptide hormone secreted by the parathyroid gland in response to low levels of calcium in the blood. It acts to maintain normal blood levels of calcium by increasing the number of osteoclasts, which break down the bone matrix and release calcium into the blood. It also increases the reabsorption of calcium and magnesium ions in the kidney tubules, so that their concentration is maintained in the blood.
5. (d) Electroencephalogram is the recording of electric potentials originating from different parts of the brain in the form of waves. Fractionation is the technique of rupturing cells and separating their components especially cell organelles for studying their chemistry and functions. Electrophoresis is the technique of separation of charged solutes on the basis of their differential migration in an applied electric field.
6. (b)
7. (a) Luteinizing hormone (LH) stimulates ovulation. Deficiency of insulin causes diabetes mellitus. Deficiency of ADH or vasopressin causes diabetes insipidus. Deficiency of parathormone causes tetany. Deficiency of thyroxine causes cretinism in infants and myxoedema in adults.
8. (b) In heart cells AMP acts as secondary messenger which is made in the response of adrenaline and it stimulates Ca^{2+} ions to come out from the sarcoplasmic reticulum of muscle fibres which causes muscle contraction.
cGMP (Cyclic Guanosine Monophosphate) which acts as secondary messenger works on the action of acetylcholine, increase in flow of Ca^{2+} into muscle fibres & hence causes muscle relaxation. There is no role of sodium in hormonal action.
9. (c) Pancreas is a heterocrine gland comprising both endocrine and exocrine parts. Its endocrine part consists of small masses of hormone secreting cells called islets of Langerhans. The α-cells of latter secrete glucagons and its β-cells secrete insulin. These two hormones have antagonistic effects on the glucose level in the blood which means that insulin decreases the blood glucose level while glucagon increases blood glucose level.
10. (a) Neurons regulate endocrine activity, but not *vice-versa*.Neurons in the hypothalamus secrete thyroid releasing hormone (TRH), which stimulates cells in the anterior pituitary to secrete thyroid-stimulating hormone (TSH).
11. (b) Posterior pituitary releases vasopressin which stimulates reabsorption of water in the distal tubules in nephron.
12. (d) Osmotic pressure of body fluids is mainly maintained by the plasma proteins (albumins, globulins) and electrolyte ions (Na^+, K^+ etc). Phosphorus has nothing to do with the osmotic pressure of body fluids.
13. (c) Sertoli cells are found in the walls of seminiferous tubules of the testes. They anchor and provide nutrition to the developing germ cells especially the spermatids.
14. (b) In menstrual cycle, menstrual phase lasts for 4 days, proliferating/ovulating phase for about 10 days and secretory phase for 14 days.
15. (c) **16.(a)** **17. (a)** **18. (b)** **19. (b)**
20. (c) **21.(d)** **22. (a)** **23. (b)** **24. (d)**
25. (c) Calcium plays an important role in blood clotting. Parathormone, a hormone released by parathyroid glands, increases calcium level in the blood. Therefore, deficiency of this hormone will decrease Ca^{2+} level in the blood, thus leading to delay in blood clotting and increase in bleeding time.
26. (d) Estrogen and testosterone being steroid hormones are soluble in lipids, therefore they can cross the plasma membrane and bind to the cytoplasmic receptors to trigger their action.
27. (b)
28. (d) Hydrophobic molecules, such as steroid based hormones, can move easily through the plasma membrane.
29. (d) Insulin acts to lower blood sugar levels.
30. (d) Receptors on target cells react specifically to chemical messengers. The way they react will determine the cellular response.

31. (d) The adrenal glands secrete hormones in response to stress.
32. (b) Hormones typically act on a receptor in or on target cells to stimulate the production of proteins.
33. (d) The internal transport system may be the cardiovascular system in animals or the xylem and phloem in plants.
34. (c) Oxytocin stimulates muscle contractions during childbirth and milk letdown.
35. (c) In diabetics, the rise in blood glucose above the normal level of 80–90 mg/100ml fails to stimulate the production of insulin from the pancreatic β-cells of the islets of Langerhans. As a result, the glucose is not removed from the blood to be stored in muscle cells as glycogen, resulting in a high blood glucose level for a long period of time.
36. (c) Paracrine hormones act on local cells that are hormones act on the very same cells that secrete them.
37. (a) "Upregulation" of hormone receptors on a cell is the production of more receptors when the hormone is present over time in the blood or other fluids surrounding the cell.
38. (b) Thymic hormones stimulate T cell development.
39. (c) In many cases, hormones trigger cyclic AMP when they bind with the target cells. Cyclic AMP then carries out the action of the hormone within the cell as a second messenger.
40. (d) The pituitary gland is considered the master gland because it produces hormones that control endocrine glands throughout the body.
41. (c) Inhibited release of a releasing hormone will lead to a reduction in the secretion of a specific anterior pituitary hormone.
42. (d) **43. (c)** **44. (b)**
45. (d) Iodine is essential for the normal rate of hormone synthesis in the thyroid. Deficiency of iodine in our diet results in **hypothyroidism** and enlargement of the thyroid gland, commonly called **goitre**.
Hypothyroidism during pregnancy causes defective development and maturation of the growing baby leading to stunted growth (cretinism), mental retardation, low intelligence quotient, abnormal skin, deaf-mutism, etc.

DPP /CB23

1. (c)
2. (b) Cloning is a technique by which genetically same individuals can be produced without including any sexual reproduction eg. Dolly sheep.
3. (d) **4. (d)**
5. (b) The parents that have survived to reproduce asexually are able to survive in the current stable environment. Therefore, the offspring should be preadapted for this stable environment.
6. (a) Species that exhibit parthenogenesis develop from unfertilized eggs produced by the mother. Therefore, the genetic make-up should be 100 percent the same as the mother.
7. (a) Since external fertilization can only take place in an aquatic habitat, there are no terrestrial animals that use it.
8. (a) Many animals reproduce both by asexual and sexual means.
9. (b) All these animals can reproduce sexually. However, only the chicken lays an external egg.
10. (b) All of these statements concerning asexual reproduction are correct, except that asexual reproduction is best in favorable, stable environments, ones that don't change rapidly. The reason for this is that asexual reproduction, in contrast to its sexual counterpart, results in the formation of identical offspring. Although asexual organisms can often produce many more offspring in a single reproductive event than sexual organisms, these asexually produced young do not usually have the genetic variation caused by meiosis and crossing-over to be able to survive a rapidly changing environment or times of environmental stress.
11. (a) Buds in 'eyes' form new plants.
12. (b) Bud giving rise to new plant is present towards base.
13. (b) New plants in cane-sugar are formed from nodes which are absent.
14. (b) Water absorption & gaseous exchange stop due to presence of wax
15. (c) Parthenocarpy is the development of a fruit without the formation of seeds as a result of lack of pollination, lack of fertilization and lack of development. This condition can be artificially induced by application of hormones.
16. (a) **17. (a)** **18. (a)** **19. (d)**
20. (c) Most of banana varieties are triploid and triploidy is associated with seedlessness.
21. (d) **22. (b)** **23. (b)** **24. (a)** **25. (d)**
26. (a) Homothallic and monoecious are terms used to denote bisexual condition. The example indudes fungi and plants. Heterothallic and dioecious are terms used to denote unisexual condition.
27. (b) Morphallaxis is a mechanism of regeneration involving reorganization of body cells. In epimorphosis, new cells proliferate from the surface of the wound to form the missing structure. In accretionary growth some specialized cells retain the ability to divide and produce new cells to replace the worn-out.
28. (a) Cells become variable in shape, size & getting their specialization for the formation of particular tissue or organ in future foetus. They place themselves at some specific regions in embryo for further organogeny.
29. (d) Earthworm, sponges, tapeworms are bisexual animals and hermaphrodites as they prossess both male and female reproductive organs.
30. (c)
31. (c) Sowing is related with sexual reproduction.
32. (c) Vegetative propagation in mint occurs through sucker. Vegetative reproduction is a type of asexual reproduction for plants, and is also called vegetative propagation, vegetative multiplication, or vegetative cloning. It is a process by which new plant "individuals" arise or are obtained without production of seeds or spores. It is a natural process in many plant species (as well as non-plant organisms such as bacteria and fungi) and used or encouraged by horticulturists to obtain quantities of economically valuable plants. A related technique used in cultivation is tissue culture, which involves vegetative reproduction under sterile conditions.
33. (d) Vegetative reproduction and apomixis, both are asexual methods of reproduction, which gives the progeny genetically similar to parent.
34. (c) **35. (c)** **36. (b)** **37. (d)** **38. (d)**
39. (c) **40. (d)**
41. (b) In oomycetes female gamete is large and non motile while male gamete is small & motile.
42. (c) Male sex organ is called antheridium or globule while female sex organ is called oogonium. They develop on the same branchlet in the same plant in *chara.*
43. (c)
44. (c) In most aquatic organisms, such as a majority of algae and fishes as well as amphibians, syngamy occurs in the external medium (water), *i.e.*, outside the body of the organism. This type of gametic fusion is called external fertilisation.
45. (d)

DPP /CB24

1. (c) In porogamy the tip of pollen tube enters the micropyle, pushes through the nucellar tissue & finally pierces the egg-apparatus end of the embryo sac. If pollen tube enters through the chalazal side it is called chalazogamy & if it enters laterally it is called mesogamy.

2. (b) Dry indehiscent single-seeded fruit formed from bicarpellary syncarpous inferior ovary is cypsela. Cypsela is also called inferior, false or pseudocarpic achene, the thin fruit wall (developed from pericarp and thalamus)is attached to the seed at one point but the fruits develops from an inferior, unilocular and uniovuled ovary, *e.g*., sunflower, marigold. Some cypsela develop pappus for dispersal *e.g. Sonchus*, *Taraxacum.*

3. (d) Each pollen has two layered wall. The outer layer is thick, tough, cuticularised called exine which is composed of a material called "sporopollenin". It is highly resistant to biological and physical decomposition, due to which pollens are preserved for a long time in fossils.

4. (b) **5. (d)**

6. (c) Embryo sac is 7-celled structure. There is a large central cell with two polar nuclei, egg apparatus with egg cell and 2 synergids present at micropylar end and its chalazal end, 3 antipodal cells are present.

7. (b) Nucellus - 2n, antipodal cells - n
Antipodal cells - n, egg cell - n
Antipodal cells - n, megaspore mother cell - 2n
Nucellus - 2n primary endosperm nucleus - 3n
Antipodal and egg cell are the product of meiotic division and rest are not.

8. (a) Polyembryony refers to the formation of more than one embryo within a seed of a flowering plant. *e.g.* Citrus.

9. (c)

10. (b) In oogamy male and female gametes are morphologically as well as physiologically different. Female gametes are large and non-motile. Male gametes are small but motile.

11. (d) Cotyledons and testa respectively are edible parts in groundnut and pomegranate. A cotyledon is a significant part of the embryo within the seed of a plant. Upon germination, the cotyledon may become the embryonic first leaves of a seedling. Testa is often thick or hard outer coat of a seed.

12. (a) **13. (c)**

14. (a) Some fleshy fruits such as mango, plum etc. usually have a single hard stone that encloses a seed, called drupe.

15. (a) Herkogamy – when there is some physical barrier present between the stamens and carpels avoiding any chance of self pollination.
Cleistogamy – when the flowers remain closed, self-pollination is the rule.
Dichogamy – when the two sexes mature at different times.

16. (b)

17. (a) Unisexuality of flowers prevents autogamy, but not geitonogamy. In self fertilisation , the male and female gametes are derived from the same individual. Among plants, self fertilization also called autogamy is common in many cultivated species, *eg*., wheat and oats. However, self fertilization is a form of inbreeding and does not allow for the mixing of genetic material; if it occurs over a number of generations it will result in offspring being less vigorous and productive than those resulting from cross fertilization.

18. (a) Amphitropous : Both body of ovule and embryo sac are curved. The embryo sac assumes horse-shoe shape. *e.g. Papaveraceae*.

19. (d) The male gamete will be haploid (n). 2 polar nuclei will be diploid (2n). Endosperm formed by fusion of male gamete with two polar nuclei will be pentaploid.

$$\text{Male gamete} + 2 \text{ polar nuclei} \rightarrow \text{Endosperm}$$
$$(n) \qquad (2n) + (2n) \qquad (5n)$$

20. (a) Monocarpic plants are the plants in which flowers and fruits are formed only once after vegetative growth of several years e.g., some bamboos, *Agave*, etc.

21. (c) In angiosperms, microsporangium is equivalent to pollen sac, megasporangium is equivalent to nucellus and embryo sac is equivalent to female gametophyte. Pollen grain or microspore represents immature male gametophyte.

22. (a) Ovule is an integumented megasporagium found in spermatophytes which develops into seed after fertilization. An angiospermic ovule is typically an ovoid and whitish structure. It occurs inside ovary where it is attached to a parenchymatous cushion called placenta either singly or in a cluster. The ovule is stalked. The stalk is called funiculus or funicle. The point of attachment of the body of the ovule with the funiculus is known as hilum.

23. (d) Autogamy (Gk. autos-self, gamos-marriage) is a type of self pollination in which an intersexual or perfect flower is pollinated by its own pollen.
Geitonogamy (Gk. geiton-neighbour, gamos-marriage) is a type of pollination in which pollen grains of one flower are transferred to the stigma of another flower belonging to either the same plant or genetically similar plant. In geitonogamy, the flowers often show modifications similar to ones found in xenogamy or cross pollunation.
Xenogamy (Gk. xenos-strange, gamos-marriage) or cross pollination is the transfer of pollen grains from anther of one flower to the stigma of a genetically different flower.

24. (d) *Cannabis* is wind pollinated plant.

25. (b) The typical and the most common type of embryo sac, found in 80% flowering plants is called *Polygonum* type of embryosac. It contains 8 nuclei but 7 cells – 3 micropylar, 3 chalazal and one central. It is formed by one meiosis and three mitosis.

26. (a) The pollen tube eats its way through the solid part of the stigma and style by secreting pectinases and hydrolytic enzymes. Pollen tube travels intercellularly and chemotropically along the concentration gradient of calcium – boron -inositol sugar complex.

27. (a) Stigma is the terminal receptive part of the pistil which functions as landing platform for the pollen grains. It also determines the compatibility of the pollen grains.

28. (c) The tapetal layer is of great physiological significance as all the food material entering into the sporogenous tissue diffuses through this layer. Ultimately, the cells of tapetal layer disorganise. Thus, tapetum makes a nutritive layer for the developing microspores.

29. (b) The typical and the most common type of embryo sac, found in 80% flowering plants is called *Polygonum* type of embryosac. It contains 8 nuclei but 7 cells – 3 micropylar, 3 chalazal and one central. It is formed by one meiosis and three mitosis.

30. (b) Outer layer (exine) of pollen grain is made of a highly resistant substance called sporopollenin (Zelisch, 1932). Sporopollenin is not degraded by any enzyme. It is not affected by high temperature, strong acid or strong alkali. Because of sporopollenin, pollen grains are well preserved as fossils.

31. (c) One or more thin areas present in the exine of pollen grain are known as germ pores. The germ pores are apertures in the exine layer of the pollen grain where the sporopollenin is absent. The germ pore helps in the formation of the pollen tube and the release of the male gametes during fertilization. There are usually three germ pores in dicots (tricolpate) and one in monocots (monocolpate).

32. (a) Megaspore mother cell (MMC) is the sporogenous cell that divides to give 4 haploid megaspores. Out of these 4 megaspores, only one is functional and other three degenerate. Hence 100 meiotic divisions are required for the formation of 100 functional megaspores.

33. (c)

34. (c) Autogamy is possible only when anther and stigma are close together and there is synchrony in pollen release and stigma receptivity. As in case of cleistogamous flowers, the flowers remain closed so that anthers and stigmas are never exposed. The flowers undergo only self pollination. No external pollinating agency is required.

35. (b) Apogamy is the reproduction without the fusion of gametes, and usually without meiosis. The term may include any form of vegetative reproduction. The production of a diploid gametophyte from the sporophyte due to the absence of meiosis is known as apospory. Parthenogenesis is the development of an unfertilized egg into a complete individual without fertilization. Production and development of seedless fruits is called parthenocarpy.

36. (a) Endosperm represents the food storing tissue of a seed. It is produced as a result of double fertilization in angiosperms. In most monocots and some dicot seeds, the food reserve remains in the endosperm. They are called endospermic or albuminous seeds, e.g., cereals, castor, coconut, rubber. However, in the majority of dicot seeds (e.g., pea, gram, bean, mustard, groundnut) and some monocot seeds (e.g., orchids, *Sagittaria*), the endosperm is consumed during seed development and the food is stored in cotyledons and other regions. They are called nonendospermic or exalbuminous seeds.

37. (b) Part of embryo axis between the plumule and cotyledonary node is epicotyl (above the level of cotyledons) while the part between radicle and cotyledonary node is called hypocotyl (below the level of cotyledons).

38. (b) Pollination will not occur

39. (b) There will not be insect pollination

40. (a) Germination of pollens will not occur in ovule.

41. (d)

42. (c) Embryo can not grow without food stored in cotyledons.

43. (b) Pollens are formed by meiosis.

44. (b)

45. (c) Obligate symbiotic relationship is present between *Yucca* flowers and moth, *Tageticula*.

DPP /CB25

1. (c) During breast feeding, prolactin hormone (required for the release of milk) present in the blood inhibits the release of LH from pituitary. This will counter the effect of LH on the ovarian follicles and therefore no ovulation will occur. Hence, no pregnancy occurs during this period.

2. (a) 3. (d)

4. (b) The corpus luteum is essential for establishing and maintaining pregnancy in females. In the ovary, the corpus luteum secretes estrogens and progesterone, which are steroid hormones responsible for the thickening of the endometrium and its development and maintenance, respectively.

5. (b)

6. (b) Foetal ejection reflex in human female is induced by fully developed foetus and placenta. When a woman is in a lithotomy or semi-sitting position, the foetal ejection reflex is impaired and the increased pain caused by the sacrum's inability to move as the baby descends can be intolerable.

7. (b) Acrosome a small pointed structure at the tip of nucleus. It breaks down just before fertilization, releasing hydrolytic enzymes that assist penetration between follicle cells that surrounds the ovum, thus facilitating fertilization.

8. (c) Sertoli cells are found in the walls of seminiferous tubules of the testes. They anchor and provide nutrition to the developing germ cells especially the spermatids.

9. (b) In menstrual cycle, menstrual phase lasts for 4 days, proliferating/ovulating phase for about 10 days and secretory phase for 14 days.

10. (a) Menopause is the period when ovulation and menstrual cycle stop in human females. The period of menopause is between 45-55 years.

11. (d)

12. (c) The gland corresponding to this in female is Bertholin.

13. (a) 14. (a) 15. (b) 16. (b)

17. (b) The part of fallopian tube closest to the ovary is infundibulum. Infundibulum possess finger-like projections called fimbriae that help in collection of ovum after ovulation. It leads to wider part of oviduct called ampulla. The last part of oviduct is isthmus that has a narrow lumen and joins the uterus.

18. (c) 19. (b) 20. (b)

21. (a) Vasa efferentia are fine ciliated ductules that arise from the seminiferous tubules of testis (where sperms are formed) and open into epididymis which is a mass of long, narrow, closely coiled tubule lying along the inner side of testis. Epididymis stores the sperms. Thus, if vasa efferentia get blocked, sperms will not be transported from testes to epididymis.

22. (c) Wall of each seminiferous tubule is formed of a single layered germinal epithelium. Majority of cells in this epithelium are male germ cells and at certain places, there are present tall Sertoli cells. These cells act as nurse cells providing nutrition to the developing sperms.

23. (d) Secretion of seminal vesicle, prostrate gland and bulbourethral gland constitute seminal plasma which is rich in fructose, calcium and certain enzymes.

24. (c) The prostate gland is a single large gland that surrounds the urethra. It produces a slightly alkaline, milky secretion which forms 25% of the volume of semen. It possesses citric acid, enzymes (acid phosphatase, amylase, pepsinogen) and prostaglandins. Secretion of the prostate gland nourishes and activates the spermatozoa to swim.

25. (c) The epididymis is a mass of long narrow closely coiled tubule which lies along the inner side of each testis. Coiling forms three parts - upper caput epididymis or head, middle corpus epididymis or body and lower cauda epididymis or tail.

26. (d) Release of ovum from the ovary is called ovulation. The graafian follicle rises to the surface, sends out a protuberance or stigma and everts to release the ovum into peritoneal cavity. The empty Graafian follicle contains a blood clot which is called corpus haemorrhagic. Its granulosa cells continue to proliferate, develop yellow carotene pigment or lutein and get converted into lutein cells. This converts the ruptured a temporary endocrine gland secreting progesterone with small quantity of estrogen.

27. (c) The female external genitalia include mons pubis, labia majora, labia minora, hymen and clitoris.

28. (a) Secondary spermatocyte contains half the number of chromosomes i.e., 8 Each chromosome has 2 chromatids, therefore, 8 chromosomes will have 16 chromatids in all.

29. (d) During spermatogenesis, at the end of first maturation division (reductional division or meiosis), the primary spermatocyte divides into two haploid daughter cells called secondary spermatocytes.

30. (c) In the head of the epididymis, the sperms undergo physiological maturation, acquiring increased motility and fertilizing capacity.

31. (d) Oogenesis is the process of formation of functional haploid ova from the diploid germinal cells in the ovary. Oogenesis begins during embryonic development but is completed only after fertilization of the secondary oocyte with the sperm.

32. (b) The middle piece of sperm contains mitochondria coiled around the axial filament. They provide energy for the movement of the sperm.

33. (a) Release of ovum from the ovary is called ovulation. The Graafian follicle rises to the surface, sends out a protuberance or stigma and everts to release the ovum into peritoneal cavity. The empty Graafian follicle contains a blood clot which is called corpus haemorrhagic. Its granulosa cells continue to proliferate, develop yellow carotene pigment or lutein and get converted into lutein cells. This converts the ruptured a temporary endocrine gland secreting progesterone with small quantity of estrogen.

34. (a) FSH acts on the Sertoli cells and stimulate secretion of some factors which help in the process of spermiogenesis.

35. (a)

36. (d) TSH or thyroid stimulating hormone has no role in menstruation.

37. (c) On the 14th day of menstrual cycle, ovulation occurs, so chances of conception are optimum.

38. (c) Estrogen secreted from ovarian follicles under the influence of FSH, causes proliferation of the endometrium of the uterine wall.

39. (a)

40. (a)

41. (d) Acrosome, a cap like structure present at the tip of the sperm, is a lysosome like organelle derived from golgi apparatus.

42. (b) Prolactin is secreted by the anterior lobe of pituitary gland. After parturition, secretion and storage of milk in mammary glands is under the influence of this hormone.

43. (c) After birth, the first milk released by mammary glands is called colostrum. It is released for 2-3 days. It is thin, yellowish fluid containing cells from the alveoli of glandular tissue of mammary glands and is rich in protein, antibodies, but low in fat.

44. (a) Fusion of male and female gamete produces a zygote. Repeated division of the zygote is called cleavage forming a solid morula. After further division and rearrangement a fluid filled cavity surrounded by blastomeres - blastula is formed. The appearance of germ layers mark the gastrula.

45. (b) The type of reproduction shown in the given figure of yeast is budding. In budding, a daughter individual is formed from a small projection, the bud, arising from the parent body. In yeast, the division is unequal and a small bud is produced that remains attached initially to the parent body. Later on the bud gets separated and matures into a new yeast organism.

DPP /CB26

1. (c) Statements (i) and (iii) are correct.
- Medical Termination of Pregnancy (MTP) during first trimester is generally safe.
- Intrauterine device like copper-T are effective contraceptives.

2. (b) Amniocentesis is the most widely used method for prenatal detection of many genetic disorders. It is also a technique used for determining the sex of the foetus.

3. (d)

4. (a) Copper T is an intrauterine device which prevents the fertilized egg becoming implanted in the wall of the womb.

5. (b) **6. (a)**

7. (a) Gamete intrafallopian transfer (GIFT) is recommended for those females who cannot produce an ovum. In this process, the eggs of the donor woman are removed and in a form of mixture with sperm, transferred into fallopian tube of another woman who cannot produce ovum, but can provide suitable environment for fertilization. Thus in GIFT, site of fertilization is fallopian tube, not laboratory.

8. (a)

9. (b) Condoms are barriers made of thin rubber/latex sheath that are used to cover the penis in the male or vagina and cervix in the female, just before coitus so that the ejaculated semen would not enter into the female reproductive tract. This can prevent conception.

10. (c) **11. (a)** **12. (d)** **13. (a)** **14. (b)** **15. (b)**

16. (c) **17. (c)** **18. (b)** **19. (d)**

20. (b) The birth control pill interferes with the maturation of the follicles and the ova, inhibiting release of an egg.

21. (d) Sterilization techniques can be considered as the safest birth control measures. It provides a permanent and sure birth control. It is called vasectomy in male and tubectomy in female.

22. (c)

23. (a) Copper 'T' is an intrauterine device which prevents the fertilized egg from becoming implanted in the wall of the womb.

24. (c) Cu ions released by copper releasing intra uterine devices suppresses sperm motility.
Intra-uterine devices are inserted by doctors in the uterus through vagina. They are available as the non-medicated IUDs, copper releasing IUDs and hormonereleasing IUDs.

25. (d) Intra uterine device (IUD) is a method of contraception in India. The IUD is inserted in the woman's uterus through the cervix.

26. (d) Test-tube baby programme employs zygote intrafallopion transfer (ZIFT) technique. In this technique fusion of ovum and sperm is done outside the body of woman to form zygote which is allowed to divide forming 8 blastomeres, then it is transfered the fallopion tube of the woman.

27. (d)

28. (c) Jaundice cannot be detected in a developing foetus by amniocentesis. It is a foetal sex determination test based on chromosomal pattern in the amniotic fluid surrounding the developing embryo. It is now legally ban in India.

29. (d) Medical termination of pregnancy (MTP) or induced abortion became legal in India from 1971 with some strict conditions to avoid its misuse. Such restrictions are important to check indiscriminate and illegal female foeticides which are reported to be high in India. All the other options are of natural methods of contraception.

30. (c) Oxytocin is birth hormone and acts on the smooth muscles of our body and stimulates their contraction. Vasopressin acts mainly at the kidney and stimulates resorption of water and electrolytes and reduces loss of water through urine. Hence, it is also called as anti-diuretic hormone (ADH).

31. (a) STDs are more common in 15-24 years age group. Gonorrhoea, syphilis, genital herpes, chlamydiasis, genital warts, trichomoniasis, hepatitis-B and AIDS are some of the common STDs. Haemophilia is sex-linked recessive disease, which show its transmission from unaffected carrier female to some of male progeny. Sickle cell anaemia is an autoimmune linked recessive trait in which both the partners are carriers for the gene.

32. (d) In Intra-Uterine Transfer (IUT), embryo with more than 8-blastomeres stage (morula) is used for transfer into the uterus.

33. (c) Reproductive health in society can be improved by creating awareness among people about various reproduction related aspects and providing facilities and support for building up a reproductively healthy society.

34. (b) **35. (b)** **36. (b)** **37. (a)**

38. (d) Amniocentesis involves prenatal diagnosis of metabolic error and other genetic abnormalities.

39. (a) The programmes called 'family planning' for reproductive health awareness were initiated in 1951.

40. (d) Reproduction-related areas are currently in operation in India come under the popular name 'Reproductive and Child Health Care (RCH) programmes.

41. (b) 'Saheli'–an oral contraceptive for the females was developed at Central Drug Research Institute (CDRI) in Lucknow, India.

42. (b) In artificial insemination (AI) technique, the semen collected either from the husband or a healthy donor is artificially introduced either into the vagina or into the uterus (IUI – intrauterine insemination) of the female.

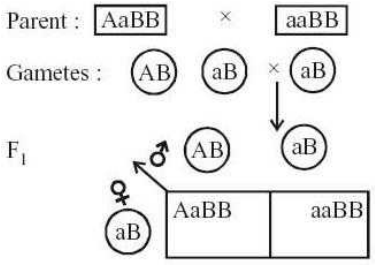
43. (c) An ideal contraceptive should be user-friendly, easily available, effective and reversible with no or least side-effects.

44. (c) Reproductive health is a crucial part of general health and a central feature of human development. It is a reflection of health during childhood, and crucial during adolescence and adulthood, Reproductively healthy societies have normal sex related emotional and behavioural interactions.

45. (a) To get rid of unwanted pregnancies and to prevent the fatality or harmfulness to the mother or to foetus or both due to the continuation of pregnancy are the reasons on the basis of which pregnancy can be terminated

DPP /CB27

1. (a) AaBB × aaBB on crossing gives 50% individuals having genotype AaBB and 50% individuals having genotype aaBB.



2. (b) Incomplete dominance is the phenomenon where none of the alleles are dominant, with the effect that the hybrid produced by crossing two pure individuals is a mixture between the parents.

3. (d) When a pair of contrasting characters are studied during hybridization, it is called dihybrid cross. In F_2-generation, its ratio is 9 : 3 : 3 : 1.
It means when parents having –
Yellow, round seeds (IIRR) × Crossed with green wrinkled seeds (iirr)
will give
9 – Yellow round seeds.
3 – Yellow wrinkled seed.
3 – Green round seeds.
1 – Green wrinkled seeds

4. (b) Genetic mapping help in studying the architecture of the chromosomes and of entire genome.

5. (a) Epistasis is the phenomenon of masking or suppressing the phenotypic impression of a gene pair by a non allelic gene pair which impresses its own effect.

6. (b) Independent assortment of genes takes place only when they are located on separate non-homologus chromosomes. Where two or more than two genes are located on same chromosome, independent assortment will not be possible.

7. (b) In eukaryotic cells, two cytoplasmic organelles, mitochondria and chloroplast of green plants, contain their own genetic materials.

8. (b) A cross of F_1 hybrid with its recessive homozygous parent is called the test cross. It is done to determine the genotype of a given plant. If the given plant has homozygous dominant traits then on test cross it gives all dominant trait plants but if it is heterozygous dominant than it gives dominant and recessive phenotypes in 1 : 1 ratio.

9. (b) Pleiotropy is the condition in which a single gene influences more than one trait.
Polyploidy is a condition in which individuals have more than two complete sets of chromosomes.
Apomixis is a reproductive process in plants that superficially resembles normal sexual reproduction but there is no fusion of gametes.

10. (c) A gene may have more than two alternative forms occupying the same locus on a chromosome, such alleles are known as multiple alleles and the phenomenon is turned as multiple allelism. ABO blood group has 3 alleles. I^O, I^A or A, I^B or B.

11. (b) Aneuploidy is the numerical change in the chromosome number of the genome. Euploidy is the phenomenon of having multiple or more than twice the number of genome.

12. (d) Haemophilia is a sex linked recessive trait carried by X chromosome (also known as bleeder's disease).

13. (d) Sickle cell anaemia (in which nucleotide triplet CTC is changed to CAC) affects the β-globin chain of haemoglobin. Since these changes occur at a particular locus or point of a chromosome where specific gene is located, they are called as point mutation.

14. (b) Down's syndrome is due to trisomy of 21st chromosome and is an autosomal abnormality.

15. (d) A barr body is one of the X-chromosomes in somatic cells of females. If there are more X-chromosomes, then there will be more barr bodies.

16. (b) Down's syndrome develops due to trisomy of chromosome number 21. In Turner's syndrome, the effect appears due to fusion of a gamete without sex chromosome and a gamete with one X-chromosome (44 + X). Klinefelter individuals are phenotypically males. The defect appears due to fusion of egg having unreduced sex complement (A + X X) with a gamete carrying Y chromosome (44 + XXY). Gynandromorphism occurs among *Drosophila*. In such individuals one half of the body shows male characters and the other half shows female characters.

17. (c) Sex in *Drosophila* is a function of the ratio of the number of X chromosomes to the number of autosomal sets. Therefore a *Drosophila* with a X/A =1.0 will be a female whereas the one with a X/A ratio = 0.5 will be male. However, in humans the presence or absence of the Y chromosome determines sex.

18. (c) The lack of independent assortment in sweet pea and *Drosophila* is due to linkage.

19. (c) Baldness is a sex influenced trait. The dominance of alleles may differ in heterozygotes of the two sexes.

20. (a) Cri-du-chat/cat cry syndrome is due to the deletion of a large part of the small or one of the 5^{th} chromosome.

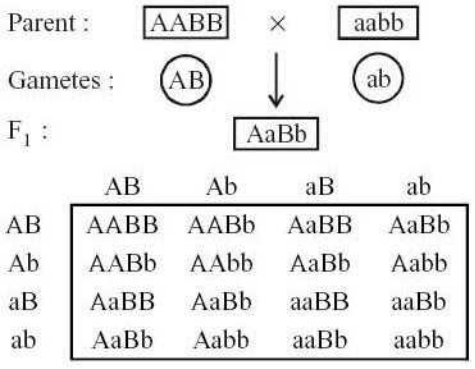
21. (d) Biometric genetics is the mathematical or statistical study of genetic phenomenon. In this branch, data of various genetic traits are analysed by applying the principles of statistics. It helps in the investigation of various genetic principles and checks their correctness and probability.

22. (b) In grasshopper the males lack a Y-sex chromosome and have only an X-chromosome. They produce sperm cells that contain either an X chromosome or no sex chromosome, which is designated as O.

23. (d) Linkage is the inheritance of genes of same chromosome together and capacity of these genes to retain their parental combination in subsequent generation. The strength of linkage between two genes is inversely proportional to the distance between the two. This means, two linked genes show higher frequency of recombination if the distance between them is higher and lower frequency if the distance is smaller.

24. (a)

25. **(c)** Genotype is the genetic make up of an individual irrespective of the mendelian characters or genes impressing.



	AB	Ab	aB	ab
AB	AABB	AABb	AaBB	AaBb
Ab	AABb	AAbb	AaBb	Aabb
aB	AaBB	AaBb	aaBB	aaBb
ab	AaBb	Aabb	aaBb	aabb

26. **(d)**

27. **(c)**

28. **(d)** Phenylketonuria is a human genetic disorder in which the body does not contain the enzyme phenylalanine hydroxylase, necessary to metabolize phenylalanine to tyrosine, and converts phenylalanine instead to phenylpyruvic acid. As PKU is an autosomal recessive genetic disorder each parent must have at least one defective allele of the gene for PAH, and the child must inherit a defective allele from each parent. As such, it is possible for a parent with a PKU phenotype to have a child without PKU if the other parent possesses at least one functional allele of the gene for PAH. A child of two parents with the PKU phenotype will always receive two defective alleles so will always have PKU. The gene for PAH is located on chromosome 12.

29. **(a)** Chromosomes occur in homologous pairs. Somatic cells have diploid number of chromosomes. Humans have 23 pairs *i.e.* 46 chromosomes. 22 pairs of autosomes and 1 pair of sex chromosomes i.e. XX in females and XY in males.

30. **(a)**

31. **(d)** Given that recombinant percentage is 7% and 5% therefore, total recombinants would be 7 + 5 = 12%. It is known that one map unit is the distance that yields 1% recombinant chromosomes. Hence distance between two non-allelic genes = 12 map units.

32. **(b)** In the given cross, passing of disease is from carrier female to male progeny (criss-cross inheritance). Any trait that shows criss-cross inheritance is located on the sex chromosome.
Presence of a single recessive gene i.e. X^c in carrier individuals (XX^c) does not cause the disease, thus the trait is recessive.

33. **(b)**

34. **(b)** A cross between heterozygous long-winged flies and (homozygous) vestigial winged flies represents an example of test cross, in which the exact Mendelian ratio of 1 : 1 is obtained. i.e., 96 long-winged flies and 96 vestigial winged flies.

35. **(b)** Incomplete dominance is the phenomenon of neither of the two alleles being dominant so that expression in the hybrid is intermediate between the expressions of the two alleles in homozygous state. F_2 phenotypic ratio is 1 : 2 : 1, similar to genotypic ratio.

36. **(a)** To determine the genotype of a tall plant of F_2 generation, Mendel crossed the tall plant from F_2 generation with a dwarf plant. He called this a test cross. In a typical test cross an organism (pea plants) showing a dominant phenotype whose genotype is to be determined is crossed with the recessive parent instead of self-crossing. The progenies of such a cross can easily be analysed to predict the genotype of the test organism. Normal test cross ratio for a monohybrid cross is 1 : 1 and for a dihybrid cross is 1 : 1 : 1 : 1.

37. **(a)** Quantitative inheritance (polygenic inheritance) is a type of inheritance controlled by one or more genes in which the dominant alleles have cumulative effect with each dominant allele expressing a part or unit of the trait, the full trait being shown only when all the dominant alleles are present. e.g., kernel colour in wheat, skin colour in human beings, human intelligence, height in human beings and several plants, etc.
The ability of a gene to have multiple phenotypic effects because it influences a number of characters simultaneously is known as pleitropy. The genes involved are called pleiotropic genes. It is not essential that all the traits are equally influenced. Sometimes the effect of a pleiotropic gene is more evident in case of one trait (major effect) and less evident in case of others (secondary effect). An example of this in humans is the disease phenylketonuria, which also produces abnormal phenotypic traits such as mental retardation, widely placed incisors, pigmented patches on the skin and excessive sweating for multiple alleles.

38. **(b)** Chromosomal theory of inheritance believes that chromosomes are vehicles of hereditary information which possess Mendelian factors or genes and it is the chromosomes which segregate and assort independently during transmission from one generation to the next. Chromosomal theory of inheritance was proposed by Walter Sutton and Theodore Boveri independently in 1902. But it was later modified and expanded by Morgan, Sturtevant and Bridges.

39. **(c)** Linked genes are those genes which do not show independent assortment but remain together because they are present on the same chromosome. In linkage, there is a tendency to maintain the parental gene combination except for occasional crossovers.

40. **(b)** In ZW-ZZ type of sex determination, the male has two homomorphic sex chromosomes (ZZ) and is homogametic, and the female has two heteromorphic sex chromosomes (ZW) and is heterogametic. There are, thus, two types of eggs: Z and W, and only one type of sperms, i.e., each with Z. Fertilization of an egg with Z chromosome by a sperm with Z chromosome gives a zygote with ZZ chromosomes (male).
Fertilization of an egg with W chromosome by a sperm with Z chromosome yields a zygote with ZW chromosomes (female). This mechanism operates in some vertebrates (fishes, reptiles and birds).

41. **(c)** Since colourblindness is a sex-linked recessive trait and males just have one X chromosome, they can never be the carriers. Males will always express the disease/phenotype.

42. **(d)** In a stable population, for a gene with two alleles, 'A' (dominant) and 'a' (recessive), if the frequency of 'A' is p and the frequency of 'a' is q, then the frequencies of the three possible genotypes (AA, Aa and aa) can be expressed by the Hardy-Weinberg equation:
$p^2 + 2pq + q^2 = 1$
where p^2 = Frequency of AA (homozygous dominant) individuals q^2 = Frequency of aa (homozygous recessive) individuals
2pq = Frequency of Aa (heterozygous) individuals
so, p = 0.6 and q = 0.4 (given)
$\therefore$ 2pq (frequency of heterozygote) = $2 \times 0.6 \times 0.4 = 0.48$.

43. (b) The distance between genes is measured by map unit. 1% crossing over between two linked genes is known as 1 map unit or centi Morgan (cM). 100% crossing over is termed as Morgan (M) and 10% crossing over as deci Morgan (dm).

44. (d) Dominant autosomal traits are caused by dominance autosomal genes. Some of the dominantly autosomal inherited disorder in human beings are : Polydactyly– presence of extra fingers and toes , Huntington's disease or Huntington's chorea — a disorder in which muscle and mental deterioration occurs and there is gradual loss of motor control resulting in uncontrollable shaking and dance like movement (chorea), phenylthiocarbamide (PTC) tasting, etc.

45. (a) Most of the gene mutations involve a change in only a single nucleotide or nitrogen base of the cistron. These gene mutations are called point mutations. e.g. sickle cell anaemia in which polypeptide chain coding for hemoglobin contains valine, instead of glutanic acid due to substitution of T by A in second position of triplet codon.

DPP /CB28

1. (d) rRNA occurs inside ribosomes. m RNA brings information from DNA to polypeptides. hnRNA are heterogenous nuclear RNA.

2. (d) (a) **Helicase** also known as unwindase, these enzymes separate the two strands of DNA.
(b) **Topoisomerases :** Tension produced by unwinding of DNA strands is reduced by these enzymes.
(c) **RNA Primase :** This is an RNA polymerase, which helps in the synthesis of a small fragment of RNA called primer.

3. (a) DNA ligase is the enzyme which helps in joining two fragments of DNA. The enzyme is used in DNA replication as it joints the Okazaki segments (also in proof reading). It also finds its use in genetic engineering as it can join two or more desired nucleotide sequences of DNA.

4. (a) In 1953 Wilkins obtained very fine X-ray crystallographic pictures of DNA from which Watson and Crick developed the double helix model of DNA.

5. (c) Okazaki fragments in DNA are linked up by the enzyme DNA *ligase*. Replication always occurs in 5' - 3' direction. Okazaki fragments synthesized on 3' - 5' DNA template, join to form lagging strand which grows in 3' - 5' direction.

6. (d) The phenomenon of making DNA over RNA genome through enzyme reverse transcriptase is called reverse transcription or teminism.

7. (c) Telomerase is a ribonucleoprotein which synthesize the rich strand of telomers in DNA. **Telomerase** is an enzyme that adds specific DNA sequence repeats ("TTAGGG" in all vertebrates) to the 3' ("three prime") end of DNA strands in the telomere regions, which are found at the ends of eukaryotic chromosomes. The telomeres contain condensed DNA material, giving stability to the chromosomes. The enzyme is a reverse transcriptase that carries its own RNA molecule, which is used as a template when it elongates telomeres, which are shortened after each replication cycle. Telomerase was discovered by Carol W. Greider in 1984.

8. (b) During transcription, from the DNA template, complementary mRNA is formed and thymine is replaced by uracil.

9. (d) Replication begins at the *Ori* - origin of replication and proceeds on both sides from the Ori. Unidirectional replication is rare. RNA primers are involved in both prokaryotes and eukaryotes.

10. (c) During the process of replication the enzyme that helps to cut one strand of DNA duplex to release the tension of coiling of two strands is topoisomerase.

11. (c)

12. (d) It was given by Geneticists George W. Beadle and E. L. Tatum which states that each gene in an organism controls the production of a specific enzyme. It is these enzymes that catalyze the reactions that lead to the phenotype of the organism.

13. (b) The transforming chemical discovered by Griffith in his experiments with *Pneumococcus*, was confirmed as DNA by Avery, McLeod and McCarty.

14. (a)

15. (a) Statement (i) and (iv) are / is correct
Regulation of *lac* operon by repressor is referred to as negative regulation. In negative regulation, a repressor molecule binds to the operator of an operon and terminates transcription. In positive regulation, an activator interacts with the RNA polymerase in the promoter region to initiate transcription. Human genome contains some 20,000-25,000 billion genes bases.

16. (a) In negative (repressible) operon, the repressor co-repressor complex binds with the operator. The free repressor cannot bind to the operator.

17. (b)

18. (a)

19. (c) In eukaryotes, DNA organization is complex. There is a set of positively charged, basic proteins called histones. Histones are rich in the basic amino acid residues lysine and arginine. There are five types of histone proteins – H_1, H_2A, H_2B, H_3 and H_4. Four of them (H_2A, H_2B, H_3 and H_4) produce histone octamer called nu body or core of nucleosome. The negatively charged DNA is wrapped around the positively charged histone octamer to form nucleosome. DNA connecting two adjacent nucleosomes is called linker DNA which bears H_1 histone proteins.

20. (c) Transformation is a phenomenon by which DNA isolated from one type of cell when introduced into another type is able to give some of its properties to the latter. In 1944, Avery, McCarty and MacLeod discovered that protein-digesting enzymes (proteases) and RNA-digesting enzymes (RNase) did not affect transformation, so the transforming substance was not a protien or RNA. Digestion with DNase did inhibit transformation, suggestion that the DNA caused did inhibit transformation, suggesting that the DNA caused the transformation. They concluded that DNA is the hereditary material.

21. (d) Synthesis in DNA by DNA polymerases occurs only in 5' $\rightarrow$ 3' direction. One strand called leading strand, is copied in the same direction as the unwinding helix. The other strand is known as the lagging strand. Replication of lagging strand is in a discontinuous way, synthesizing short segments of DNA which are always in the 5' $\rightarrow$ 3' direction. These short segments are called Okazaki fragments joined together by the action of DNA ligase.

22. (b) In tRNA, there is a TΨC loop which contains pseudouridine and ribothymidine. The loop is the site for attaching to ribosomes. Another loop, DHU loop contains dihydrouridine. It is binding site for aminoacyl synthetase enzyme. tRNA molecules have unpaired (single stranded) CCA–OH sequence at the 3' end. This is called amino acid attachment site, because the amino acid becomes covalently attached to adenylic acid or A of CCA sequence during polypeptide synthesis. Anticodon loop is made up of three nitrogen bases for recongnising and attaching to the codon of mRNA.

23. (d) According to Chargaff's rules (1950), purine and pyrimidine base pairs are present in equal amounts in a DNA molecule. i.e., [A + G] = [T + C]

$$\text{or } \frac{[A+G]}{[T+C]} = 1 .$$

24. (c) 2'–OH group present in ribose sugar of every nucleotide of RNA is a reactive group. Uracil present in RNA is less stable as compared to thymine (= methyl uracil) of DNA. Being unstable, RNA mutates at a much faster rate and there is no repairing system. That is why RNA viruses have shorter life span. They mutate and evolve very fast.

25. (c) The segment of DNA that takes part in transcription is called transcription unit. It has three components (i) a promoter, (ii) the structural gene and (iii) a terminator. Besides a promoter, eukaryotes also require an enhancer. Promoter is located upstream of structural gene. It is called 5' end of the coding strand which is 3' end of template strand. Terminator region is present downstream of structural gene at the 3' end of coding strand which if actually 5' end of the template strand. Promoter has different parts for attachment to various transcription factors. In many cases, the promoter has an AT rich region called TATA box. The area has a groove to which specific protein components can combine. TATA containing region is also called Pribnow box.

26. (b) Eukaryotes have three RNA polymerases. RNA polymerase I is located in the nucleolus and transcribes for rRNAs (28s, 18s and 5.8S), RNA polymerase II is localized in the nucleoplasm and used for hnRNA, mRNA and RNA polymerase III is localized in the nucleus, possibly the nucleolar-nucleoplasm interface and transcribes for tRNA, 5s tRNA and snRNAs.

27. (a) UAA is a nonsense codon. It signals for polypeptide chain termination. Hence, only 24 amino acids chain will be formed.

28. (d) Regulation of gene expression can be exerted at four levels:
(i) Transcriptional level during formation of primary transcript.
(ii) Processing like splicing, terminal additions or modifications
(iii) Transport of RNAs from nucleus to cytoplasm and
(iv) Translational level

29. (c) A typical nucleosome contains 200 bp of DNA helix. Nucleosomes constitute the repeating unitof a structure in nucleus called chromatin. Chromatin is held over a scaffold of non histone chromosomal (or NHC) proteins. At some places chromatin is densely packed to form darkly stainned heterochromatin. At other places chromatin is loosely packed. It is called euchromatin. It is transcriptionally active chromatin whereas heterochromatin is transcriptionally inactive and late replicating or heteropycnotic.

30. (d) Process of DNA synthesis where by a parent DNA molecule is faithfully copied, giving rise to two identical daughter molecules is called DNA replication. In DNA synthesis, DNA polymerase plays important role having the capability to elongate an existing DNA strand but cannot initiate the synthesis. So, the synthesis is initiated with the help of RNA primer formed by RNA primase. RNA primase synthesizes the short primer RNA of about 10 nucleotides that is elongated by DNA polymerase to form an okazaki fragment of DNA during DNA replication. Helicase unzips the two strands of DNA and topoisomerase reduces the coiling tension developed due to the unwinding of the two strands.

31. (b) Lactose operon in *E.coli* is a catabolic pathway in which the structural genes remain switched off unless the inducer (Lactose) is present in the medium.

32. (d)

33. (a) DNA fingerprinting is the technique of determining nucleotide sequences of certain areas of DNA which are unique to each individual. DNA contains non cistronic hypervariable repeat sequences called VNTR. DNA fingerprinting involves the identification of these VNTRs.

34. (a) In negative (repressible) operon, the repressor co-repressor complex binds with the operator. The free repressor cannot bind to the operator.

35. (a) Operator gene allows the functioning of the operon.

36. (c) If the *lac* repressor is non functional, it cannot bind the operator site and transcription of the *lac* operon will occur at all times, whether or not lactose is present.

37. (d) Option *a* refers to the *lac* and *trp* repressors, option *b* to the CRP protein, and option *c* refers to promoter that have different transcriptional efficiencies.

38. (a) 39. (b) 40. (b) 41. (a)

42. (b) The presence or absence of tryptophan determines whether the genes that code the necessary enzymes in tryptophan synthesis will even be transcribed.

43. (c) Option (a) describes transcription in eukaryotic cells; Option (b) describes translation.

44. (c) DNA replication is an energy-consuming process that must have an input of energy to proceed. Energy is provided in the breaking of the triphosphate tails of each nucleotide.

45. (a) AUG is initiating codon. UCG codes for serine, UUU codes for phenylalanine, UGU codes for cysteine.

DPP /CB29

1. (a) Genetic drift can operate only on smaller populations where its fluctuation can be observed in the proportion of allele distribution in the presence of external disturbances. Genetic drift is the random change in allele number and frequency in a gene pool.

2. (a)

3. (d) Flipper of seal and wing of birds are modified forelimbs, thus, have same fundamental structure but have different functions. Flippers are meant for swimming and wings are meant for flying. Therefore, these organs are homologous organs.

4. (c) Prevalence of pesticide resistant insects supports natural selection theory e.g., DDT was thought to be an effective insecticide against household pests (like mosquitoes houseflies, body lice) in 1945. But, within 2 to 3 years of its introduction, new DDT resistant mosquitoes appeared in the population. These mutant strains, soon became well established in the population by natural selection and thus replaced the original DDT-sensitive mosquitoes.

5. (b) Paleozoic era is the era of ancient life. The correct arrangement of periods of this era is Cambrian → Ordovician (age of invertebrates) → Silurian → Devonian (age of fishes) → Carboniferous (age of Amphibians) → Permian.

6. (b) *Homo erectus* appeared about 1.7 million years ago in middle pleistocene. Its brain capacity was about 900 cc. He was about 1.5-1.8 m tall having erect posture.

7. (b) Stabilizing selection favours average sized individuals while eliminates small sized individuals. It reduces variation and thus, does not promote evolutionary change. But it maintains the mean value from generation to generation. In directional selection, the population changes towards one particular direction. It favours small or large sized individuals and more individuals of that type will be present in next generation. The mean size of the population changes. Disruptive selection favours both small-sized and large-sized individuals, It eliminates most of members with mean expression, so produces two peaks in the distribution of the trait that may lead to development of two different individuals. It is important in bringing about evolutionary change.

8. **(b)** It is presumed that the first living organisms were chemoheterotrophs that obtained energy by the fermentation of complex organic substances available to them from the sea broth. They were anaerobes.

9. **(d)** The cranial capacity of Neanderthal man was 1400 cc, of Peking man was 850 - 1100 cc, of java ape man was 800 - 1000 cc and of African man was 500 cc.

10. **(b)** Hardy-Weinberg principle describes a theoretical situation in which a population is undergoing no evolutionary change. It states that allele frequencies in a population are stable and constant from generation to generation. There are five factors that affect Hardy-Weinberg Principle. These are - mutation, gene flow, genetic drift, genetic recombination and natural selection pressure.

11. **(c)** In allopatric speciation, a part of the population becomes geographically isolated from the main population. The population becomes entirely separated and finally constitutes a new species in Galapagos Islands is an example of allopatric speciation.

12. **(d)** In a stable population, for a gene with two alleles, 'A' (dominant) and 'a' (recessive), if the frequency of 'A' is p and the frequency of 'a' is q, then the frequencies of the three possible genotypes (AA, Aa and aa) can be expressed by the Hardy-Weinberg equation:
$p^2 + 2pq + q^2 = 1$
where p^2 = Frequency of AA (homozygous dominant) individuals
q^2 = Frequency of aa (homozygous recessive) individuals
2pq = Frequency of Aa (heterozygous) individuals
so, p = 0.6 and q = 0.4 (given)
$\therefore$ 2pq (frequency of heterozygote) = $2 \times 0.6 \times 0.4 = 0.48$.

13. **(d)**

14. **(b)** According to Lamarckism (proposed by Lamarck), whatever characters an individual acquires in its life time due to internal vital force, effect of environment, new needs, use/ disuse of organs, they are inherited to next generations. This process continues and after several generations, the variations are accumulated upto such an extent that they give rise to new species. Melanization in peppered moth favours Drawin's theory of natural selection.

15. **(c)**

16. **(a)** In 1953, Stanley Miller and Harold Urey created, in the laboratory, conditions comparable to those of early Earth, with water vapour, hydrogen, methane, and ammonia. The Miller-Urey apparatus produced a variety of amino acids and other organic compounds found in living organisms today.

17. **(b)** This is the definition of fitness.

18. **(b)**

19. **(d)** Fitness is a measure of an organism's genetic contribution to the next generation.

20. **(b)** **21.** **(b)**

22. **(b)** The analogous organs show convergent evolution due to similar adaptation. They do not support organic evolution. Whale, seal and shark shows convergent evolution due to similar habitats.

23. **(b)** Speciation takes place via reproductive isolation which is the most important consequence of geographical isolation.

24. **(d)** Scales on their hind limbs and eggs with calcareous shell, indicates in birds about their reptilian ancestry.

25. **(d)** Jurassic period of meoszoic era was about 19-20 crore years ago & lasted for about 5.5-6 crore years. The climate was hot and damp. It is called the age of dinosaurs. Ist primitive bird *Archaeopteryx* evolved from reptiles. Ist angiosperm appeared as a dicotyledon but gymnosperms were dominant.

26. **(a)** The theory of the continuity of the germplasm was published by August Weismann (1834-1914) in 1886. It proposes that the contents of the reproductive cells (sperms and ova) are passed on unchanged from one generation to the next, unaffected by any changes undergone by the rest of the body. It thus, rules out any possibility of the inheritance of acquired characteristics, and has become fundamental to Neo-Darwinian theory.

27. **(b)** The eye of octopus and eye of cat show different patterns of structure, yet they perform similar functions. This is an example of analogous organs.
Analogous organs have evolved due to convergent evolution . Analogous organs have developed in the evolutionary process through adaptation of quite different organisms to similar mode of life.

28. **(a)** Genetic drift is variation in gene frequencies within populations that can occur by chance rather than by natural selection. Sometimes the change in allele frequency is so different in the new sample of population that they become a different species. The original drifted population becomes founder and the effect is called founder effect.

29. **(b)** Darwin observed an amazing diversity of creatures on Galapagos islands. He realised that there were many varieties of finches in the same island like seed-eating, with altered beaks insectivorous and vegetarian finches. Carrion are dead bodies. No finches feed on carrion.

30. **(b)** The term Evolution was given by Herbert Spencer that is "Descent with modifications". Evolution helps us to understand the history of life.
Evolution is a process in which something changes into a different and usually more complete or better form over time and in response to environment. This results in descendents becoming different from ancestors.

31. **(c)** Organs that are similar in fundamental structure but different in functions are "Homologous organs", Richard Owen, introduced the term homologous. Pectoral fins of fish and fore limbs of horse similar in structure but different in functions are homologous organs.
Rest of the organs compared in the question are analogous organs.

32. **(b)** One of the first attempts to explain the mechanism of evolution was made by Jean Baptiste de Lamarck. His theory was Inheritance of Acquired Characters. The theory states that the characters acquired during life time are passed on to the progeny and then to subsequent generations and new species are produced.

33. **(b)** Progressive evolution is development of organisms with more elaborate and specialized structures from those having less elaborate features e.g. amphibians from reptiles .Retrogressive or degenerative evolution is development of simpler forms from more complex ones. Such evolution has occurred in case of vestigial organs, parasitic forms, and in reduction of overspecialized structures such as wings in flightless birds. Parallel evolution is formation of similar traits in related groups of organisms independently due to similar requirement e.g. running of two toed deer and one toed Horse. Evolution of wings in insects and birds serve as example of convergent evolution.

34. **(b)** In the embryos of all vertebrates, the presence of gill slits supports the theory of recapitulation (repeating the early stages of embryogenesis in earlier evolved animals).

35. **(a)** The change in the colour of peppered moth is due to the mutation of single mendelian gene for the survival in the smoke-laden industrial environment. It is called Industrial melanism.

36. **(c)** Chimpanzees and gorillas are our closest relatives among the living primates.

37. **(c)** Electron Spin Resonance method is the most accurate method for dating of fossils.

38. (a) Adaptive radiation refers to evolution of different species from a common ancestor. The mammals are adapted for different mode of life i.e. they show adaptive radiation. They can be aerial (bat), aquatic (whale and dolphins), burrowing or fossorial (rat), cursorial (horse), scantorial (squirrel) or arboreal (monkey). The adaptive radiation, the term by Osborn, is also known as Divergent evolution.

39. (d) The most significant trend in evolution of modern man (*Homo sapiens*) from his ancestors is development of brain capacity.

40. (b) According to Oparin, the atmosphere of primitive earth was reducing because its atoms were most numerous and most reactive. Free oxygen was not present in significant amount. Large quantities of H_2, N_2, water vapour, CO_2, CH_4 and NH_3 were present.

41. (b) There is no life on moon due to absence of water. There are many other reasons for being no life on moon, like insufficient oxygen, unsuitable temperature etc.

42. (b) *Cro-Magnon* fossils have been found in Europe. Neanderthal man is a transitional stage. *Australopithecus* appeared in early Pleistocene.

43. (c) The primitive atmosphere was reducing due to lack of free molecular oxygen. The early atmosphere contained ammonia (NH_3), water vapour (H_2O), hydrogen (H_2), methane (CH_4).

44. (a) Marsupials in Australia and placental mammals in North America show convergent evolution. These two subclasses of mammal have adapted in similar ways to a particular food supply, locomotor skill or climate.

45. (b) *Australopithecus* is one of the longest-lived and best-known early human species whose remains were found between 3.85 and 2.95 million years ago in Eastern Africa (Ethiopia, Kenya, and Tanzania). Evidences shows that they hunted with stone weapons but essentially ate fruits.

DPP /CB30

1. (c) A special defence system works specially against viral infection. It has no effect on micro-organism. Cells invaded by a virus produce an antiviral protein called interferon (IFN). The latter is released from the infected cell and on reaching the nearby non-infected cells it makes them resistant to the virus infection.

2. (c) Syphilis is caused by bacteria *Treponema pallidum*.

3. (c) The lymphocytes which differentiate in the thymus are known as the T - lymphocytes. T-lymphocytes are responsible for the cellular immune response.

4. (b) The major obstacle in transplantation of organs is that the recipient body does not accept the donor's organ. The body defence mechanism rejects & treats the transplanted organ as a foreign particle and reacts actively.

5. (b) Tranquilizers bring about depression of brain activity and feeling of calmness. Stimulants stimulate the nervous system, and increase alertness and activity. Hallucinogens (*Cannabis* products) alters thoughts, perceptions and feelings.

6. (b) *Rauwolfia serpentina* belong to the family *Apocynaceae*, its roots yield a chemical useful for high blood pressure.

7. (d) Tetanus and typhoid are caused by bacteria. Whooping cough is caused by bacteria. Sleeping sickness is caused by parasitic flees. Syphilis is caused by bacteria while AIDS is the final stage of HIV viral disease. Measles and Rabies are caused by virus.

8. (a) Allergy means all kinds of untoward reactions manifested in the body due to hypersensitivity of substances called allergens. Allergy reactions occur due to liberation of histamine by tissue cells.

9. (c) Carcinomas are malignant growths of the epithelial tissue that cover or line the body organs.

10. (c) HIV is a spherical, enveloped virus of about 90-120 nm diameter. Its nucleocapsid is icosahedral and its genome consists of **a** single-stranded RNA filament segmented into two identical filaments and associated with a "reverse transcriptase enzyme".

11. (c)

12. (d) AIDS is caused by HIV virus and Gonorrhoea is caused by *Neisseria gonorrhoea*. Urethritis is inflammation of the urethra by bacteria. Syphilis is caused by *Treponema pallidum.*

13. (c) The saliva in the mouth and the tears from the eyes belong to physiological barriers.

14. (d) Widal test is used for the diagnosis of typhoid. It is an agglutination test for the presence of antibodies against the *Salmonella* organisms, which cause typhoid fever.

15. (b) Amphetamines bring about increased alertness and sleeplessness. Hashish is a hallucinogen. Valium is a tranquilizer. Valium depresses brain activity and produces feeling of calmness, relaxation and drowsiness. Morphine is an opiate narcotic.

16. (c) Whenver our body gets attacked by some foreign invadors, our body's immune system produces some chemicals to kill or to react against the invader. These chemicals are actually made up of carbohydrates & proteins *i.e.* glycoproteins called antibodies.

17. (a) B and T-lymphocytes produce antibodies against pathogen in the body, if due to some reason B and T-lymphocytes are damaged the body will not produce antibodies against a pathogen. Each B cell and T cell is specific for a particular antigen.

18. (b) Pollen–grains of many species are responsible for some of the severe allergies and bronchial affliction in some people often lead to chronic respiratory disorders - asthma, bronchitis.

19. (c) Tetanus toxoid is a vaccine consisting of growth products of *Clostridium tetani* treated with formaldehyde serving as an active immunising agent. Hence it is weakened germs. The first tetanus toxoid (inactivated toxin) was produced in 1924 and was used successfully to prevent tetanus in the armed services during World War II. In the mid-1940s, tetanus vaccine was combined with diphtheria toxoid and inactivated pertussis vaccine to make the combination DTP vaccine for routine childhood immunization.

20. (d) AIDS (Acquired Immune Deficiency Syndrome) is caused by HIV retrovirus. The virus destroys the helper T lymphocytes thus reducing their numbers.

21. (d) 22. (a) 23. (a) 24. (b)

25. (a) Preformed antibodies need to be injected to treat the bite by a viper snake. It is also a type of immunization which is called as passive immunization.
Antibodies, produced by B-cells, are typically made of basic structural units—each with two large heavy chains and two small light chains. B cells differentiate into plasma cells that secrete antibodies. Antibodies are proteins that bind to specific antigens and mark them for destruction by, for example, making them more recognizable to phagocytic cells. Rejection of a kidney graft is not a function of B lymphocyte.

26. (b) Infectious diseases are those diseases that can spread from one person to another e.g., AIDS. Non-infectious diseases are those diseases that cannot spread from one person to another e.g., cancer.

27. (a) Common cold is caused by some 100 types of Rhino viruses. Symptoms of common cold are irritation of nasal tract, nasal congestion, flow of mucus, sore throat, sneezing, cough, headache and slight fever.

28. (c) Elephantiasis or filariasis is caused by a number of worms. However, in India only two types of worms are responsible for this disease, *Wuchereria bancrofti* and *W. malayi*. This disease is transmitted by female *Culex* mosquitoes. Elephantiasis affects lymphatic vessels of the lower limbs.

29. (d)

30. (d) Hepatitis B is a viral disease, transmitted through both blood and sexual intercourse.

31. (d) Plague is a bacterial disease caused by *Yersinia pestis*. Symptoms of this disease are high fever and a bubo in the groin or armpit. It is primarily a disease of rodents but accidently affects man. The vector of this disease is rat fleas that carries germs of plague from rat to rat. When the rats dies of plague, the fleas leave the dead rat and if any man is nearby, they bite him and inject some plague germs into his blood. Shigellosis or bacillary dysentery, is a diarrheal illness resulting from an acute inflammatory reaction caused by *Shigella*.

32. (a) Skin amd mucous membrane are the physical barriers that provide the first line of defence or the external defence. These barriers prevent the enrty of micro-organisms into the body. Outer tough layer of the skin, the stratum corneum prevents the enrty of bacteria and viruses. Mucus secreted by mucous membrane traps the microorganisms and immobilises them.

33. (a) The substances to which an exaggerated response of the immune system occurs are called allergens. The antibodies produced to these are of lgE type.

34. (d) If the immune system fails to recognize 'self' from 'non-self' and starts destroying the body's own cells, this leads to some malfunctions, which are termed as autoimmune diseases. Both rheumatoid arthritus and myasthenia gravis are autoimmune diseases. In rheumatoid arthritis, inflammation of the synovial membrane in synovial joints occurs. When this membrane, which is the source of synovial fluid, becomes inflamed, it produces too much fluid. Thus, the joints swell and become extremely painful. Myashtenia gravis is a chronic disease marked by abnormal fatigability and weakness of selected muscles. The degree of fatigue is so extreme that these muscles are temporarily paralysed. In this disease, antibodies bind to cholinergic receptors on muscle cells, which impairs the ability of the neurotransmitter acetylcholine to induce muscle contraction.

35. (b) 'A'-lymph nodes, 'B'-Thymus, 'C'-spleen, 'D'-Bone marrow. Thymus and bone marrow are the primary lymphoid organs where maturation of T-cells and B-cells take place respectively. Lymph nodes and spleen are the secondary lymphoid organs where T-cells and B-cells undergo proliferation and differentiation.

36. (c) When a host is exposed to antigens, which may be in the form of living or dead microbes or other proteins, antibodies are produced in the host body. This type of immunity is called active immunity. Infecting the microbes deliberately during immunization/vaccination induces active immunity e.g., polio vaccine.

37. (c) 38. (d)

39. (d) The given figure is of cannabinoid molecule. Cannabinoids are hallucinogenic chemicals obtained from leaves, resin and inflorescence of hemp plant, Cannabis sativa. Marijuana, hashish and ganja and cannabinoids.

40. (c) Cannabinoids bring about euphoria, excitement, sometimes uncontrolled laughter and dilation of pupil of eyes. These days cannabinoids are taken by some sports persons.

41. (d) Rabies, Influenza and AIDS are viral diseases, Amoebiasis, Ascariasis and Trypanosomiasis are caused by Protozoa; Taeniasis, Ascariasis and Elephantasis are the diseases caused by Helminths but Cancer, Tuberculosis and Tetanus are not related diseases. Tuberculosis and Tetanus are bacterial diseases while cancer is not.

42. (c) Lipoproteins are conjugated proteins having polypeptides in association with lipids. Immunoglobulins are the constituent of antibodies. Interferons (INFs) are a group of three vertebrate glycoproteins.
Interferon induces among adjacent cells, as antiviral state by inducing synthesis of the enzymes which inhibit the viral production cycle.

43. (d) 44. (b) 45. (a)

DPP /CB31

1. (a) Parthenocarpy is the development of fruits without prior fertilization which results in the formation of seedless fruits. In some plant species, parthenocarpic fruits are produced naturally or they may be induced by treatment of the unpollinated flowers with auxin.
Removal of androecium before pollen release is called emasculation which is helpful in preventing unwanted pollination. Vernalized seeds are the chilled treated seeds for breaking dormancy. Phenyl Mercuric Acetate is an antitranspirant.
Gibberellins and Auxins are known to induce parthenocarpy in plants. If a tomato plant is treated with a low concentration of auxin and gibberellic acid it wll produce fruits without fertilization i.e. parthenocarpic fruits.

2. (a)

3. (b) Breeding of crops with high levels of minerals, vitamin and minerals is called biofortification. This is most practical aspect to improve the health of people.

4. (b) Jaya and Ratna are two rice varieties developed for green revolution in India.
- The scientific name of Jaya is IET-723. This paddy variety takes about 130 days to grow and the grain is long, bold and white. Its yield is 50-60 quintals per hectare.
- The scientific name of 'Ratna' is IET-1411. It takes about 130-135 days to grow. The grain is long, slender and white. Its yield is 45-50 quintal/hectare.

5. (a) DDT was subsequently banned for agricultural use worldwide under the Stockholm Convention, but its limited use in disease vector control continues to these days in certain parts of the world and remains controversial. Along with the passage of the endangered Species Act, the US ban on DDT is cited by scientists as a major factor in the comeback of the bald eagle in the contiguous US.

6. (c) *Catla catla* and *Labeo rohita* are the two Indian major carps whereas *Heteropneustes* is a catfish. *Cyprinus* is the exotic breed.

7. (a) Food chain is the transfer of energy from green plants (primary producers), through a sequence of organisms in a food chain occupying different trophic level. Therefore, statements (ii) and (iii) are correct.

8. (a) Azadirachtin is a chemical compound belonging to the limonoids. It is a secondary metabolite present in the Neem tree seeds. The molecular formula is $C_{35}H_{44}O_{16}$. Azadirachtin is a highly oxidised tetranortriterpenoid which boosts a plethora of oxygen functionality, comprising an enol ether, acetal, hemiacetal, and tetra-substituted oxirane as well as a variety of carboxylic esters. It is classified among the plant secondary metabolites.

9. (c) 10. (d) 11. (c) 12. (d)

13. (d) In superovulation, a high milk yielding cow is induced to shed 4–6 eggs (instead of one) every 6–8 weeks (instead of 20–21 days). The superovulated donor is artificially inseminated with semen from a quality bull. The embryos developing from the eggs so fertilised are flushed out. These good quality embryos are now transferred to surrogate mother for delivery.

14. (d) Karl Von Frisch, carried out many experiments and determined that when a foraging bee returns to the hive, it performs a waggle dance. Honey is predominantly glucose and fructose. *Dorsata* is a bigger bee than *Apis indica* (a medium sized bee). Bees wax is secreted by special wax glands to make compartments.

15. (a) 16. (a) 17. (a) 18. (b) 19. (b) 20. (a)

21. (a) White leghorn is a mediterranean breed.

22. (a)

23. (c) Golden rice is vitamin A rich variety developed by rDNA technology and used in the treatment of vitamin A deficiency.

24. (d) Golden rice is a transgenic crop of the future with high Vit. A content. Millions of people suffer from Vit. A deficiency which leads to vision impairment. Transgenic rice has been developed which is capable of synthesizing beta carotene, the precursor of Vitamin A. The rice variety is now being crossed into adapted varieties with field tests possible in an year or two.

25. (a)

26. (d) Main objective of production/use of herbicide resistant GM crops is to reduce herbicide accumulation in food articles for health safety. GM plants has been useful in many ways. Genetic modifications has made crops more tolerant to abiotic stresses, reduced reliance on chemical pesticides, enhanced nutritional value of food.

27. (d) In order to obtain virus-free plants through tissue culture, the best method is meristem culture. Meristem tip culture is used successfully to remove viruses, bacteria, in order to produce the greatest number of plants. Meristem culture is used to produce healthy propagation stock for crops and ornamentals.

28. (c) Gene library contains DNA fragments representing the entire genome of an organism. So collection of alleles of the genes of a crop is called gene library.

29. (b) Vector DNA are the DNA molecules that can carry a foreign DNA segment and replicate inside the host cells. Vector DNA may be plasmids, a bacteriophage, cosmids, yeast artificial chromosomes.

30. (c)

31. (a) Three crops that contribute maximum to global food grain production are Wheat, rice and maize, which belong to the family *Poaceae* (*Graminae*).

32. (d) 'Himgiri' developed by hybridisation and selection for disease resistance against rust pathogens is a variety of wheat. It is resistant to leaf/stripe rust and hill bunt.

33. (b)

34. (b) Controlled breeding experiments are carried out using artificial insemination. The semen is collected from the male and is injected either deep into the cervix or at the beginning of the body of the uterus of the selected female by the breeder. The semen may be used immediately or can be frozen and used later. It can also be transported in a frozen form.

35. (b) Breed is a group of animals related by descent and similar in most characters like general appearance, features, size, configuration, etc.

36. (b) Inbreeding strategies allow the desirable qualities of more closely related individuals to be continued within the same breed for 4-6 generations. It increases homozygosity and thus, is necessary for evolving a pure line. Continued inbreeding, especially close inbreeding usually leads to reduces fertility and even productivity. This is called inbreeding depression.

37. (b) Products of honey bee are honey, bee wax, bee venom and royal jelly. Medicinal importance includes its uses as laxative, antiseptic, sedative, etc. It is also used against digestive disorders. Bee venom is used to cure gout and arthritis. Bee was is used is producing cosmetics, paints polishes, etc. It is not a labour intensive process and is source of additional income to the farmers.

38. (c) Germplasm is the sum total of all the alleles of the genes present in a crop and its related species. The germplasm of any crop species consists of the following types of materials: cultivated improved varieties, improved varieties that are no more in cultivation, old local or 'desi' varieties, pure lines produced by plant breeders, and wild species related to the crop species.

39. (d) Tobacco mosaic is caused by Tobacco Mosaic Virus. The infection causes characteristic patterns, such as "mosaic"-like mottling and discolouration on the leaves. Turnip Mosaic Virus causes turnip mosaic. Chlorotic lesions, mosaic and mottling are the common symptoms of this disease.

40. (d) The cell from micro-organisms such as bacteria, fungi, filamentous algae, treated in various ways and used as food, are called single cell protein (SCP). The biomass is not only obtained from unicellular microorganisms but also from multicellular microorganisms.

41. (d) Meristem is a localized group of cells, which are actively dividing and undifferentiated but ultimately give rise to permanent tissue. Cultivation of axillary or apical shoot meristems is called meristem culture. Meristem culture is carried out in potato, banana, cardamom, orchids (protocorm stage), sugarcane, strawberry, sweet potato, etc.

42. (b) The plant cell without cell wall are called protoplasts.

43. (b) The above figures of maize, wheat and garden pea are some Indian hybrid crops. The term "hybrid" refers to a plant variety which is developed through the interbreeding of two or more varieties, genera or species. Though hybrids contain the best properties of the parent plants, they usually do not breed true and often revert to one of the parent plants. Hybrids are favoured for greater disease resistance, more vigorous growth, earlier maturity, higher quality of vegetables, better uniformity and improved flavour.

44. (b)

45. (c) Because iron promotes the formation of chlorophyll and magnesium is an integral part of chlorophyll molecule so in the absence of these nutrients plants show chlorosis & leaves get yellowing. Application of iron and magnesium to promote the synthesis of chlorophyll can cure the disease.

DPP /CB32

1. (d) Activated sludge is a process for treating sewage and industrial wastewaters using air and a biological floc composed of bacteria and protozoans. During the process, the primary effluent is taken to aeration tank that contain large number of aerobic heterotrophic microbes. They form flocs that digest a lot of organic matter. As the biological oxygen demand of waste water is reduced, it is passed into settling tank to undergo sedimentation. The sediment of the settling tank is called activated sludge that is a rich source of aerobic bacteria. Hence, the statement (d) is correct.
Biogas is produced by anaerobic breakdown of biomass with the help of methanogenic bacteria. It is made up of methane, carbon dioxide with traces of nitrogen, hydrogen sulphide and hydrogen.
Methanobacterium is an anaerobic bacterium that is found in rumen of cattle and is helpful in the breakdown of cellulose.

2. (c) 'Each antibiotic is effective only against one particular kind of germ' is not correct.

3. (d) *Monascus purpureus* is a yeast used in the production of statins which are used in lowering blood cholestrol.

4. (d) A common biocontrol agent for control of plant diseases is *Trichoderma. Trichoderma* is a tree living fungus that exerts biocontrol over several plant pathogens for the control of plant diseases. It is the natural method of pest and pathogen control.

5. (c) A fed batch is a biotechnological batch process which is based on feeding of a growth limiting nutrient substrate to culture. It is done for purifying enzymes.

6. (a) 2100 antibiotics have been reported so far from actinomycetes alone. Of these maximum antibiotics have been reported from streptomyces alone. Waksman isolated streptomycin from *Streptomyces griseus.*

7. (c) **8. (a)**

9. (c) *Aspergillus niger* is used for production of citric acid in industries.

10. (d)

11. (a) Human insulin is being commercially produced from a transgenic species of *Escherichia coli. E. coli* is a bacterium that is commonly found in the lower intestine of warm blooded animals. The bacteria can also be grown easily and its genetics are comparatively simple and easily manipulated, making it one of the best studied prokaryotic model organisms, and an important species in biotechnology.

12. (d) Organic farming involves use of organic wastes and other biological material along with beneficial microbes to release nutrients to crop to increase the soil fertility in an ecofriendly, and pollution free environment. *Glomus,* earthworm and *Oscillatoria* can be used in organic farming while snail cannot.

13. (d)

14. (c) *Clostridium butylicum* industrially produces butyric acid.

15. (b) **16. (b)** **17. (c)** **18. (c)**

19. (b) **20. (a)** **21. (c)**

22. (a) Farmers have reported over 50% higher yields of rice by using the biofertilizer *Azolla pinnata*.

23. (d) Microbes are omnipresent, found in soil, water, air, ice, iside bodies of human beings, animals and plants. Some are found in hot springs (upto 80°–100°C) and even in geysers (thermal vents).

24. (b) Prions are highly resistant glycoportein particles which function as infectious agents. Prions can also act as catalyst converting nomal protein into prion state. Prions are not affected by proteases, nucleases, temperature upto 800°C, UV radiations and formaldehyde.

25. (c) Probiotics are live microgranisms (bacteria in most cases) that are similar to beheficial micriorganisms found in the human gut. They are also called "friendly bacteria" or " good bacteria". Probiotic microorganisms consist mostly of strains of *Lactobacillius, Bifidobcterium* and *Streptococcus*. Probiotics are taken as food supplement and energy drinks (e.g. Yakult).

26. (c)

27. (b) Flocs are masses of bacteria held together by slime and fungal filaments to form mesh like structures.

28. (a) Secondary treatment of sewage (or biological treatment) depletes 90-95% of the BOD and many pathogens are removed. Reduction of BOD by 90% is achieved through mineralization of small fraction of organic matter and conversion of large proportion to removable solids.

29. (d) Methanogens are microorganisms that produce methane as a metabolic byproduct in anoxic condition. They include *Methanobcterium*, *Methanobrevibacter* and *Methanococcus*.

30. (d) **31. (b)**

32. (b) Organic farming includes serval methods to enhance soil fertility. In such farming, methods of biological origin are used e.g., biopesticides biofertilizers, IPM (Integrated Pest Management) green manure, bioherbicides etc. Chemical fertilizers are not used in organic farming.

33. (b)

34. (c) *Oscillatoria* and *Nostoc* are nitrogen fixing cyanobacteria. They add orgnaic matter as well as extra nitrogen to the soil. Cyanobacteria are very important and low-cost biofertilizers.

35. (d) Commercial ethanol or ethyl alcohol is produced by yeast *Saccharomyces cerevisiae.*

36. (d) Lactic acid bacteria help in souring milk. Ripening of cheese is done by bacteria (*Propionibacterium shermanii*) or moulds (*Penicillium roqueforti*).

37. (a) Brewer's yeast lack sufficient diastase and amylase therefore if complex carbohydrates have to be acted upon by them, 1% malt or inoculation with fungus like *Rhizopus* is done to degrade sugars.

38. (b) Baggasse is crushed sugarcane from which sugar has been extracted. It is used for fuel in sugar refineries and in making of fibre board.

39. (b) The bacteria *Clostridium acetobutylicum* is used to produce butanol and acetone from starch. This bacteria was first used by Chaim Weizmann in 1920.

40. (a) **41. (d)**

42. (c) *Aspergillus niger* is related with production of gallic acid.

43. (b) The label A represents sludge, label B represents methane and carbon dioxide, and the label C represents dung and water.

44. (a)

45. (a) BOD is the method of determining the amount of oxygen required by microorganisms to decompose the waste present in the water supply. It is a measure of organic matter present in the water. If the quantity of organic wastes in the water supply is high then the number of decomposing bacteria present in the water will also be high. As a result, BOD value will increase.

DPP /CB33

1. (a) The linking of antibiotic resistance gene with the plasmid vector became possible with DNA ligase. DNA ligase is an enzyme that is able to join together two portions of DNA and therefore plays an important role in DNA repair. DNA ligase is also used in recombinant DNA technology as it ensures that the foreign DNA is bound to the plasmid into which it is incorporated.

2. (b) DNA or RNA segment tagged with a radioactive molecule is called probe. They are used to detect the presence of complementary sequences in nucleic acid samples. Probes are used for identification and isolation of DNA and RNA.

3. (a) Restriction endonucleases are enzymes that makes cuts at specific positions within the DNA molecule. They acts as molecular scissors. They recognise specific base sequence at palindromic sites in DNA duplex and cut its strands.

4. (d) In gel electrophoresis, agarose extracted from sea weed used as gel agarose, made of 0.7% gel show good resolution of large DNA and 2% gel will show good resolution of small fragments.

5. (d)

6. (b) Cloning is the production of an organism with exactly similar genetic make up as in the mother individual. Cloning is done to preserve genotype of an individual. This is achieved by cell culture, tissue culture or genetic engineering.

7. (d) Retrovirus has the ability to transform normal cells into cancerous cells. Hence, it can used as a vector for cloning desirable genes into animal cells.

8. (d) In pBR 322;
-ori-represents site of origin of replication
-rop-represents those proteins that take part in replication of plasmid.

-*Hind* III, *Eco*RI- Recoginition sites of Restriction endonucleases
-amp^R and tet^R - They are antibiotic resistant gene part.

9. (c) Electroporation is the method of making cell membrane permeable for the entry of recombinant DNA into the bacteria.

10. (c) The Southern blot is used to detect and identify certain DNA sequences in a sample of bodily fluid. It uses single-stranded DNA to search out their complementary strands. When a Southern blot is performed on DNA, the first step is digestion of DNA with restriction enzymes. Restriction enzymes cut DNA at known sequences, and produces DNA fragments of a certain length. Once the DNA is cut into pieces, scientists conduct electrophoresis to separate them by size.

11. (a) PCR is now a common and often indispensable technique, developed in 1984 by Kary Mullis, used in medical and biological research labs for a variety of applications. These include DNA cloning for sequencing, DNA-based phylogeny, or functional analysis of genes; the diagnosis of hereditary diseases; the identification of genetic fingerprints (used in forensic sciences and paternity testing); and the detection and diagnosis of infectious diseases. In 1993, Mullis won the Nobel Prize in Chemistry for his work on PCR.

12. (d) For gene transfer into the host cell without using vector microparticles made of tungsten and gold coated with foreign DNA are bombarded into target cells at a very high velocity.

13. (b) The first fecombinant DNA was constructed by Stanley Cohen and Herbert Boyer in 1972. They cut the piece of DNA from a plasmid carryign antibotic-resistance gene in the bacterium *Salmonella typhimurium* and linked it to the plasmid of *Escherichia coli*. The vector transfers the piece of DNA attached to it.

14. (a) Genetic engineering is the artificial synthesis, isolation, modification, combination, addition and repair of the genetic material (DNA) to alter the phenotype of the host organims to suit human needs. It is the manipulation of genes by man in vitro. Restriction endonucleases play major role in genetic engineering as they can cut DNA at specific sites.

15. (c) Electrophoresis is a technique of separation of molecules such as DNA, RNA or protein, under the influence of an electrical field, so that they migrate in the direction of electrode bearing the opposite charge, viz, positively charged molecule move towards cathode (–ve electrode) and negatively charged molecues travel towards anode (+ve electrode) under an electric filed through a matrix of agarose gel. The DNA fragments separate according to their size through the agarose gel, with smaller fragments moving farther away as compared to larger ones. The DNA fragments can be visualized by staining them with ethidium bromide followed by exposure to UV radiations. Bright orange coloured bands of DNA can be observed. The separated DNA bands are then cut out from the agarose gel and extracted from the gel piece. This step is known as elution. The DNA fragments purified in this manner are used in constructing recombinant DNA by joining them with cloning vectors.

16. (c) The DNA used as a carrier for transferring a fragment of foreign DNA into a suitable hosts is called vehicle DNA of cloning vector or gene carrier. When desired gene is introduced into a vector, recombinant DNA is formed. Vectors may be plasmids, bacteriophages, cosmids, phagemids, Yeast Artificial Chromosomes (YACs) Bacterial Artificial Chromosomes (BACs), transposons, viruses, etc.

17. (d) **18. (b)**

19. (d) *Escherichia coli* is a bacterium found in human colon. On this bacterium scientists have made extensive genetic experiments to make some vital chemicals like insulin. Another bacterium is *Agrobacterium tumefaciens* which causes crown gall in plants is extensively used for genetic experiments.

20. (c) PCR is a technique for enzymatically replicating DNA without using a living organism such as *E. coli* or yeast. It is commonly used in medical and biological research labs for a variety of tasks like detection of hereditary diseases, identification of genetic fingerprints etc.
The correct steps shown in the given figure are:
A – Denaturation at a temperature of about 94° to 98°C. During the denaturation, the double strand melts open to single stranded DNA, and all enzymatic reactions stop.
B – Annealing (binding of DNA primer to the separated strands. Occurs at 50° to 65°Celsius, which is lower than the optimal temperature of the DNA polymerases)
C – Extension or elongation of the strands using the DNA primer with heat-stable DNA polymerases, most frequently Taq (*Thermus aquaticus*) at 72ºC.

21. (d) **22. (c)** **23. (a)** **24. (b)**

25. (c) Transformation is a process by which a cell takes up naked DNA fragment from the environment, incorporates it into its own chromosomal DNA and finally expresses the trait controlled by the incoming DNA. Since DNA is a hydrophilic molecule, it can not pass through membranes, so that bacterial cells must be made competent to take up DNA. This is done by treating them with a specific concentration of a divalent cation, such as calcium (Ca^{2+}) which increases the efficiency with which DNA enters the bacterium through pores in its cell wall. Recombination DNA (rDNA) can then be forced into such cells by incubating them briefly at 42° C (heat shock), and then putting them back on ice. This enables the bacteria to take up the recombination DNA.

26. (c) Polymerase chain reaction is a technique used to replicate a fragment of DNA so as to produce many copies of a particular DNA sequence. A single PCR amplification cycle involves three basic steps: denaturation, annealing and extension (polymerisation).

27. (a) Eukaryotic genes do not function properly when transferred into bacterial cell because introns are present in eukaryotic cells but are absent in prokaryotic cells. Hence, when bacterial cell is transformed with recombinant DNA generated using human gene, it could not process it. As a result desired protein will not be produced.

28. (b) **29. (b)** **30. (a)** **31. (c)**

32. (d) Direct gene transfer is the transfer of naked. DNA into plant cells but the presence of rigid plant cell wall acts as a barrier to uptake. Therefore, protoplasts are the favoured target for direct gene transfer. Polyethylene glycol mediated DNA uptake is a direct gene transfer method that utilizes the interaction between polyethylene glycol, naked DNA, salts and the protoplast membrane to effect transport of the DNA into the cytoplasm.

33. (d) **34. (c)**

35. (d) The fact that DNA is structured the same way in all known organisms means that similar methods can be used to study the hereditary material.

36. (a) pBR 322 is an artificially constructed vector plasmid. It is widely used in gene cloning experiments.

37. (d) *Eco*RI is an endonuclease enzyme isolated from strains of *E.coli* and a part of restriction modified system. So, .co part stands for *coli*.

38. (a) Restriction endonuclease-*Hind* II, always cuts DNA molecules at a particular point by recognizing a specific sequence of six base pairs. This specific base sequence is known as the recognition sequence for *Hind* II.

39. (c) Chitinase is an enzyme that cleaves the glycosidic bonds in chitin, thereby breaking down the structural polysaccharide component of the hard outer covering of many animals and of the cell wall of fungi.

40. (d)

41. (c) Palindromic sequences in DNA molecule are group of bases that forms the same sequence when read in both forward and backward direction. In the given question, only option (c) represents a palindromic sequence.

42. (d) During heat shock to the bacterium, the temperature used for giving thermal shock is 42° C. This enables the bacteria to take up the recombinant DNA.

43. (d) A stirred-tank bioreactors is usually cylindrical or with a curved base to facilitate the mixing of the reaction contents. The stirrer facilitates even mixing and oxygen availability throughout the bioreactor. Alternatively air can be bubbled through the reactor.

44. (b) Downstream processing refers to the recovery and purification of biosynthetic products, particularly pharmaceuticals. It is an essential step in the manufacture of pharmaceuticals such as antibiotics, hormones (e.g. insulin and human growth hormone), antibodies and vaccines; antibodies and enzymes used in diagnostics; industrial enzymes; and natural fragrance and flavour compounds.

45. (d) Polymerase chain reaction (PCR) is a technique of synthesizing multiple copies of the desired gene (or DNA) *in vitro*.
At the start of PCR, the DNA from which a segment is to be amplified, an excess of the two primer molecules, the four deoxynucleoside triphosphates and the DNA polymerase are mixed together in reaction mixture that has appropriate quantities of Mg^{2+}. The PCR operation is followed in a sequence where denaturation, primer extention occurs.

DPP /CB34

1. (b) In this technique nematode specific genes are introduced in the host plant in such a way that it produces both sense and antisense RNA. The two RNA's being complementary to each other form a double stranded RNA (dsRNA) which is also called interfering RNA responsible for initiating RNA interference (RNA i). This (dsRNA) bind to and prevent translation of specific mRNA of nematode (gene silencing). Thus transgenic plants based on RNAi technology are resistant to nematode.

2. (a)

3. (a) RNA interference technique, sense & antisense RNA fused to form dsRNA that silent the expression of m- RNA of nematode. RNA interference is a novel strategy adopted to prevent infestation of nematode *Meloidegyne incognitia* in roots of tobacco plants. .

4. (a) Recombinant DNA technology is the process joining together two DNA molecules from two different species that are inserted into a host organism to produce new genetic combination.

5. (d) Transgenic Rosie is actually cow. Restriction enzymes cut the DNA at specific sites.

6. (b)

7. (c) Common activities in bioinformatics include mapping and analysing DNA and protein sequences, aligning different DNA *etc.* are the part of human genome project.

8. (a) Dolly sheep was obtained by cloning the udder cell (somatic cell) fused with enucleated oocyte.

9. (a)

10. (a)

11. (b) Biowar or biological war or bioterrorism is the development of biological weapons against people, their crops and animals.

12. (d) The transgenic food, containing enzyme produced by antibiotic resistance gene, can cause allergies because it is a foregin protein. The bacteria present in alimentary cancal can take up antibiotic resistance gene and become resistant to that antibiotic. Transgenes can endanger native species if Bt toxin is expressed in pollens which are transported by pollinator honey bees. GM crop prodution causes changes in natural environment which may be harmful for all organisms.

13. (c) Two cry genes, cry IAc and cry IIAb have been incorporated in cotton. The genetically modified crop is called Bt cotton as it contains Bt toxin genes. The genes cry I Ac and cry II Ab control cotton bollworms.

14. (c) Hirudin is a protein that stops blood clotting. The gene encoding hirudin was chemically synthesized. This gene was then transferred ito *Brassica napus*, where hirudin accumulaes in seeds. The hirudin is purified and used as medicine.

15. (d) Using conventional methods of diagnosis (serum and urine analysis, etc.) early detection is not possible. Recombinant DNA technology, Polymerase Chain Reaction (PCR) and Enzyme Linked Immunosorbent Assay (ELISA) are some of the techniques that serve the purpose of early diagnosis.

16. (b) Gene therapy is a collection of methods that allows correction of gene defect that has been diagonsed in a child/embryo. Correcting of a genetic defect involves delivery of a normal gene into the individual or embryo to take over the function of and compensate for the non-functional gene.

17. (a) Bioethics may be viewed as the set of standards that may be used to regulate various activites based on their effects on the biological world. This is because biotehncology has aroused social as well as political concerns, which have ranged from biotechnology being unnatural to detrimental to biodiversity.

18. (c) **19. (d)** **20. (b)** **21. (b)** **22. (a)**
23. (b) **24. (d)** **25. (d)** **26. (b)** **27. (c)**
28. (c) **29. (a)**

30. (d) The first commercial example of enzyme modification of a protein for human use is the conversion of pig insulin to human insulin called "humulin".

31. (a)

32. (b) These are all good examples of the end products of various r-DNA technologies.

33. (c) The use of BGH does not appear to have serious health or environmental drawbacks, but it could offer such a competitive edge to corporate farming operations that smaller, more traditional family farms might be forced out of business. This scenario is a good example of how genetic engineering can have unintended social consequences.

34. (d) DNA vaccines are used as injection of pure DNA or RNA into skeleton muscles leading to expression of DNA in the muscle cell.

35. (c) **36. (c)**

37. (d) Golden rice is a transgenic food crop which may help in solving the problem of night blindness in developing countries. Golden rice or miracle rice is rich in vitamin A or β-carotene and iron and decaffeinated coffee are also valuable achievements of gene transfer technology.

38. (d) Bt toxin genes were isolated from *Bacillus thuringiensis* and incorporated into cotton plant to form a genetically modified crop called Bt cotton. Bt cotton has high yield and resistance to bollworms.

39. (c) Only mammalian cells can correctly attach these sugars to proteins.

40. (b) *Agrobacterium tumefaciens* is the causal agent of crown gall disease (the formation of tumours) in over 140 species of dicot. This disease caused by a DNA plasmid (T_i plasmid) carried by bacterium and transferred to the plant cells. T_i plasmid has been widely used in plant engineering as a vector in order to inject gene in host plant to form transgenic plant.

41. (d) **42. (b)** **43. (b)** **44. (b)** **45. (a)**

DPP /CB35

1. (d) Tropical rain forests occur in equatorial and subequatorial regions. The forests receive all the external inputs for optimum plant growth. Due to abundant plant growth, a large number of animals live in tropical rain forests. In grasslands fire occur periodically which prevent tree growth. In savannahs, periods of drought are common. In deciduous forests broad leaved hard wood deciduous trees are found predominantly.

2. (b) Competition is most severe between the members of a population belonging to same habitat.

3. (a) Symbiosis or mutualism is a mutually beneficial association necessary for the survival of both the partners.

4. (c) Praying mantis is a good example of camouflage. Camouflage is the natural colouring of an animal which enables it to blend in with its surroundings.

A praying mantis, or praying mantid, is the common name for an insect of the order Mantodea. Often mistakenly spelled **preying mantis** (a tempting mistake, as they are notoriously predatory) they are in fact named for the typical "prayer-like" stance. The word *mantis* derives from the Greek word mantis for prophet or fortune teller.

A praying mantis from **India**

5. (a) Population is an aggregation or grouping of individuals of the same species at the same time in a particular area. Species is a grouping of individuals of one or more populations resembling each other in important morphological, anatomical and biochemical characters and can potentially interbreed. Biotic community is an assemblage of interdependent, and ecosystem is a self sufficient and self regulating segment of nature comprising of a biotic community and its physical environment, both interacting and exchanging materials. The basic level of ecological organisation starts with the individual, the next more complex levels are populations, species, community and then ecosystem.

6. (d) The keystone species in an ecosystem are those who are the main contributors to the ecosystem.

7. (b) Niche indicate the habitat of a particular species and the interaction of that species with the resources present in the habitat. Niche overlap means that two or more species sharing the resources present in a particular niche.

8. (a) **Stenohaline :** Steno meaning narrow and haline meaning salt. A fish cannot handle a wide fluctuation of salt content in water. Many fresh water fish tend to be stenohaline and die in environments of high salinity such as the ocean. Fish living in coastal estuaries and tide pools are often euryhaline (tolerant to changes in salinity) as are many species which have life cycle requiring tolerance to both fresh water and sea water environments such as *Salmon*.

9. (d) Human population growth in India can be regulated by following the national programme of family planning.

10. (b) Some species make permanent burrows deep into the soil to escape high temperature or sunlight and some cold blooded animals often like to bask in the sun to warm up their body.

11. (b) 12. (b) 13. (c)

14. (c) This age pyramid represents the declining population of any organism. Population decline is the reduction over time in region's census. It can be caused for several reasons that includes heavy immigration disease, famine or sub-replacement fertility.

15. (b) The logistic population growth is expressed by the equation $\frac{dN}{dt} = rN\left[\frac{(K-N)}{K}\right]$ where N is population density at time t, r is the Malthusian parameter (rate of maximum population growth) and K is the so called carrying capacity (*i.e.* maximum sustainable population). It is a type of population growth when resources are limiting.

16. (b) The best pH of soil for cultivation of plants is 6.5 – 7.5.

17. (d) A self regulatory mechanism of maintaining favourable internal conditions for uninterrupted chemical reactions in the living system despite changes in the external environment is homeostasis. Total energy stored within system is enthalpy.

18. (b) Gause's hypothesis states that two different competing species cannot coexist together for a long in the same niche, one has to get eliminated by the other competing species, if they do coexist, then they do so as a result of niche differentiation, i.e. differentiation of then realized niches.

19. (b) Speciation takes place via reproductive isolation which is the most important consequence of geographical isolation.

20. (d) Hotspots are the geographical area where biodiversity is maximum. Two hotspots in India are Western ghats and North eastern himalayan region.

21. (b) 22. (c)

23. (d) A natural association of interdependent populations of different species inhabiting a common environment or habitat as a visible, self-contained unit is called a biotic community or biocoenosis.

24. (b) A biome is a large regional unit characterized by a major vegetation type and associated fauna found in a specific climatic zone some examples of terrestrial biomes are desert, temperate deciduous forest, tropical rain forest, etc.

25. (d) Protoplasm is the material comprising the living content of a cell. It consists of 90% water alongwith the minerals, sugars, amino acids, proteins, enzymes, etc. The translocation of nutrients inside the body occurs via blood which also majorly consists of water. In an environment with excessive heat, water loss in the form of sweating and transpiration keeps the body cool. Thus, water maintains the body temperature.

26. (a) The red colour of red algae is due to abundant formationof phycoerythrin which is able to absorb blue green wavelengths of light. Being shorter, these wavelengths are able to reach the maximum depth in water. Therefore, red algae can be found in deepest ocean waters.

27. (c) The seasonal movement of complete populations of animals to a more favourable environment is called migration. It is usually in response to uneven precipitation and lower temperatures resulting in a reduced food supply and is often triggered by a change in day length. Migration is common in mammals (e.g. porpoises), fish (e.g. eels and salmon) and some insects but is most marked in birds.

28. (d) Competition is defined as the active demand by two or more individuals of the same species or members of two or more species at same trophic levels for a common resource. Intraspecific competition is competition amongst members of the same species for a common resource such as for food, space and mate. Interspecific competition amongst members of different species for a common resource such as for food, space and mate. Interspecific competition is rivalry amongst members of different species. The severity of competition depends upon similarity in the requirement of food and shelter.

29. (b) Population density is the number of individuals present per unit area of volume at a given time. If the total number of individuals is represented by letter N and the number of

units of space (area for land organisms and volume for water organisms) by letter S, then the population density D can be represented as D = N/S. For instance, number of animals per square kilometer, number of trees per acre in a forest etc.

30. (a) $\text{Date rate} = \frac{\text{Number of deaths}}{\text{Initial number of individuals}}$

$= \frac{200}{800} = \frac{1}{4} = 0.25$

31. (d) Tropical rain forest shows the maximum diversity and also the maximum productivity. More solar energy and resources are available in tropics which promotes higher productivity. On land the maximum primary production rate is found in tropical rain forests, followed by tropical deciduous forests, temperate forests, savannah, temperate grasslands and desert shrubs.

32. (c) 33. (a) 34. (c) 35. (c) 36. (c) 37. (a)

38. (c) Permafrost, a permanently frozen subsoil, is a distinctive characteristic of the tundra.

39. (a) Grasslands are typically maintained by grazing herbivores and by periodic fires. Overgrazing, such as may occur if agricultural livestock are introduced, which can lead to destruction of the grassland.

40. (c) Deserts have less than 25 centimeters of rainfall per year.

41. (c) Aestivation is the cessation or slowing of metabolic activity during the summer period to avoid problems of heat and desiccation etc.

42. (d) Blubber is the fatty layer present between the skin and muscle of whales and other cetaceans. It acts as an insulator and protects the animal from heat loss and serves as a food reserve.

43. (a) Predation is a relation between two organisms in which one organism captures and feeds on other. Commensalism is a relation between two organisms in which one benefits and the other neither derives benefit nor harms. Parasitism is a relation between organisms in which one lives as a parasite on another and harms the host. Competition is process in which the fitness and survival ability of one species is significantly lower in the presence of another species.

44. (a) Population density varies due to changes in the following basic process - A: Natality + Immigration; B: Mortality + Emigration

Natality is the proportion of births to the total population in a place in a given time. Immigration is the number of individuals of the same species that have come into the habitat from elsewhere during the time period under consideration. Mortality is the number of deaths in the population during a given period of time. Emigration is the number of individuals of the population who left the habitat and have gone elsewhere during a given period of time.

45. (c)

DPP /CB36

1. (c) 2. (b)

3. (a) A blanket of air surrounding the earth is called as atmosphere and it is divided into different strata (zone). The zone of atmosphere that lies near the ground is troposphere.

4. (b) Detritus food chain begins with dead organic matter of dead plant parts, animals and their excretory product which is being acted upon by decomposers such as saprophytes to obtain energy needed for their survival.

5. (b) Biogeochemical cycles : Two types :

(i) Gaseous : Biogenetic materials involved in circulation are gases *e.g.* N_2, O_2, CO_2 *etc.*

(ii) Sedimentary : Biogenetic materials involved in circulation are non-gaseous *eg.* P, Ca, S etc. form rocks.

6. (a) A standing crop is the quantity or total weight or energy content of the organism, which are in a particular location at a particular time.

7. (c) The decomposers act on the dead organic matter and break them down into simpler compounds and minerals.

8. (d) In soil science, humus refers to any organic matter which has reached a point of stability where it will break down no further and might, if conditions do not change, remain essentially as it is for centuries, if not millennia. In agriculture, humus is sometimes also used to describe mature compost, or natural compost extracted from a forest or other spontaneous source for use to amend soil. It is also used to describe a topsoil horizon that contains organic matter (humus type, humus form, humus profile).

9. (b) The rate at which organic molecules are formed in a green plant is called gross productivity.

10. (a) An ecosystem having low stability can be easily damaged. An ecosystem having high resilience will take less time to recover.

11. (a) Hydrarch succession takes place in wetter areas and xerarch succession respectively, which takes place in dry areas. So, both hydrarch and xerarch successions leads to medium water conditions.

12. (c) Coral reefs are often called "rainforest of the sea". It forms some of the most diverse ecosystem on earth. Coral reef ecosystem have the highest gross primary productivity in the sea.

13. (c) Polar ice caps & glaciers have the largest amount of pure and fresh water without any dissolved salt or impurity.

14. (d) Four important functional aspects of the ecocystem are (i) Productivity (ii) Decomposition, (iii) Energy flow and (iv) Nutrient cycling.

15. (a) 16. (a) 17. (a)

18. (b) The rate at which food energy is assimilated at the trophic level of consumers is called secondary productivity. In other words, the rate of synthesis of organic matter by consumers is called as secondary productivity. The primary producers have produced the food for consumers, and secondary productivity reflects only the utilization of this food for the production of consumer biomass.

19. (d) Humus constitutes the organic component of soil and is rich in lignin and cellulose. Humus is formed from organic remains through the activity of decomposer microorganisms. Process of formation of humus from raw organic remains is called humification. Humus is quite resistant to microbial action.

20. (c) Less than 50% of the solar energy incident over earth is present in PAR (photosynthetically active radiation).

21. (a) A single species may occupy more than one trophic level. Sparrow can be a primary consumer if it feeds on seeds, fruits and peas or a secondary consumer if it feeds on insects and worms.

22. (b) Secondary sucession (= subsere) is the biotic succession that occurs in an area which become secondarily bare due to the destruction of community previously present there. Secondary succession starts from previously built up substrata with already existing living matter. The action of any external force, such as sudden change in climatic factors, biotic intervention, fire, etc. had resulted in the destruction of previous community. Thus, area become devoid of living matter but its substratum, instead of primitive, is built up. It has organic matter so is biologically fertile and thus the successions are comparatively more rapid.

23. The cycling pool of carbon consists of 6×10^{14} kg (29%) of free CO_2 in the atmosphere, 1.45×10^{15} kg (71%) of dissolved CO_2 occurs in the oceans. Oceans also regulate the amount of CO_2 in the atmosphere.

24. (d) 25. (b) 26. (a) 27. (d) 28. (c)
29. (c) 30. (a) 31. (b) 32. (b) 33. (b)

34. (b) Phosphorus is mostly used as phosphate. Its reservoir pool is phosphate rocks while cycling pool is soil for terrestrial ecosystems and water for aquatic ecosystems.

35. (b) Only 10% of the mass is flown from one trophic level to another in the form of energy.

36. (c) Lichens are the early settlers on a barren area because they can tolerate desiccation, heating during summer noon or excessive cooling during winter nights. They secrete lichen acids and carbonic acid. The acids slowly corrode rock surface and release minerals required for proper growth of lichens.

37. (a) The first biotic community which develops in a bare area is called pioneer community. It has very little diversity. This stage takes the longest time to change the environment for invasion of the next community.

38. (d) Climax community is the stable, self perpetuating and final biotic community that develops at the end of biotic succession and is in perfect harmony with the physical environment.

39. (c) Identification and enumeration of plants and animal species of an ecosystem gives its species composition.

40. (d) Communities is an assemblage of interacting populations occupying a given area. Climate, species interaction, feeding relationship among organisms and succession are the factors which influence communities.

41. (d) Grassland can support greater grazing rates by herbivores than forests because grassland produces less woody plant tissue.

42. (a)

43. (c) Arrow III is incorrect.

44. (d) A : Presence of 3 - 4 storeys of plant grown in a forest is called stratification.
B : A biome having grasses with scattered trees is called savannah.
C : Man made ecosystem is dam. Man - made ecosystem are the artificial ecosystems which rely on the human efforts to sustain.
D : Pioneer in hydrosere is blue green algae.

45. (d) Decomposition involves breakdown of complex organic matter by decomposer to inorganic raw materials like CO_2, water & various nutrients. It consists of the following processes:
Fragmentation : It is the formation of smaller pieces of dead organic matter or detritus by detritivores.
Catabolism : Chemical conversion of detritus into simpler inorganic substances with the help of bacterial and fungal enzymes is called catabolism.
Leaching : Water soluble substances (formed as a result of decomposition) are leached to deeper layers of soil.
Humification : If decomposition leads to the formation of colloidal organic matter (humus), the process is called humification.
Mineralization : Formation of simpler inorganic substances (like CO_2, water and minerals) is termed mineralization.

DPP /CB37

1. (a) In situ means keeping endangered species of animals or plants into natural environment and not in the environment that looks like natural but is man made, like zoological & botanical gardens. *In situ* includes, national parks, sanctuaries and biosphere reserve.

2. (d) Biodiversity Act of India was passed by the parliament in the year 2002.

3. (b) Biodiversity is the number of variety of organism found within a specified geographic region.

4. (d) The 'Cheetah' has become extinct from India. The endangered subspecies *Acinonyx jubatus venaticus* lives in Asia (Iran). In 1990, there were reports in the Times of India of a cheetah sighting in eastern India. There is a chance some cheetahs remain in India, though it is doubtful. There have also been reports of Asiatic cheetahs in the Balochistan Province of Pakistan, though these continue to be unverified. The cheetah prefers to live in an open biotope, such as semi-desert, prairie, and thick bushes.

5. (d) Hot spots are those areas which were rich in biodiversity but now are under threat due to direct or indirect interference of human activites. These regions are on the edge to get some of their species extinct due to humans. Western Ghats in India are under threat due to continuous developmental activities and Doon valley is under threat due to continuous mining activities.

6. (b)

7. (d) *Podophyllum* is one of the endangered species of Indian medicinal plants. It is used to remove benign (not cancer) growths, such as certain kinds of warts. It works by destroying the tissue

8. (a) Kaziranga National Park in Assam is famous as a protection environmental park for rhinoceros.

9. (c) 10. (b)

11. (c) Lesser inter-specific competition is not observed in biodiversity hotspots.

12. (b) In India maximum genetic diversity is seen in rice. Total of 23 variety of irrigated ecology and 8 varieties of rainfed ecology has been invented in India.

13. (d) The statements (i) and (ii) are correct. The statement (iii) is incorrect because predators cannot lead to the extinction of prey species. Predator and prey evolve together. The statement (iv) is incorrect because chemical such as nicotine and strychnine produced by the plants are not metabolic disorders but are metabolic wastes.

14. (b) Diversity is due to the long term evolutionary changes. Adaptability to continuous changes in environmental conditions is important for natural selection of variants and variations generation after generation leading to emergence of diverse descendants.

15. (d) Higher diversity in tropical areas is because (i) Speciation is a function of time. Temperate areas have undergone frequent glaciation in the past. It killed most of the species. No such disturbances occured in tropics where species continuted to flourish and evolve undisturbed for millions of years (ii) There are no unfavouable seasons in tropics. Continued favourable environment has helped tropical organisms to gain more niche specialisation and increased diversity. (iii) More solar energy is available in tropics. This promotes higher productivity and increased biodivesity. (iv) Resoruce availability is higher in tropics (v) There is reduced competition in tropics due to favourable environment. (vi) Rate of extinction is low in tropics.

16. (b) *Lantana*, *Eichhornia* and Arican catfish are exotic species. Non-native or exotic species are often introduced inadvertently for their economic and other uses. They often become invasive and drive away the local species. These species are considered to be second major cause of extinction of species. Exotic species have proved harmful to both aquatic and terrestrial ecosystems.

17. (d) A stable community is self-prepetuating and final biotic community that is in perfect harmony with the physical

environment. It does not show much of changes and is usually resilient to natural or man made disturbances, it is also resistant to evasion by alien species.

18. (b) The number of species of aves, reptiles, amphibians and mammals are 1232, 456, 209 and 300 respectively.

19. **(a)** IUCN is International Union of Conservation of Nature and Natural Resoruces, which is now called World Conservation Union (WCU).It has its headquarters at Morges, Switzerland. It maintains a red data book or red list which is a catalogue of taxa facing risk of extinction.

20. **(a)** The relationship between species richness and area is rectangular hyperbola for a wide variety of taxa whether they are birds, bats, fresh water fishes or flowering plants and the equation can be given as $S = CA^z$. On a logarithimic scale, it is straight line described by the eqution log S = log C + z log A. Where S is species richness, Z is slope of line or regression coefficient, C is Y-intercept while A is area.

21. **(b)** Genetic diversity is the diverty in the numbers and types of genes as well as chromosomes present in different species and the variations in the genes and their allels in the same species. Genetic variation in *Rauwolfia vomitoria* indicates genetic diversity. Another example is the presence of more than 50,000 genetically different strains of rice,and 1000 varieties of mango in India.

22. **(d)** Keystone species are those species which have significant and disproportinonaely large influence on the community structure and characteristics. It often has considerably low abundance and biomass as compared to dominant species. Removal of such species causes serious disruption in structure and function of community.

23. **(b)** National park is a reserved area used for conservation purposes. It is maintained by the government. Cultivation grazing, forestry and habitat manipulation are not allowed. Protection is provided to the entire ecosystem.

24. **(d)** Bishnois of Rajasthan protect *Prosopis cineraria* and Black buck religiously.

25. **(b)** Exotic species tend to cause a the reat to biodivesity. They are not found in hot spots which are regions of high biodiversity. In India, 3 hotspots ae found, i.e., Western Ghats and Sri Lanka, Indo-Burma (NE India) and Himalays.

26. (c) Ex situ (off site) conservation is conservation of selected rare plans/animals in places outside their natural homes. Ex situ conservation includes offsite collections, gene banks in vitro fertilization, cryopreservation techniques and tissue culture.

27. (a) Jim Corbett National Park (district Nainita Uttrakhand) is the first national park of Inida, established in 1936.

28. (b) Earth Summiti at Rio de Janeiro (1992), Brazil, promoted Convention on Biological Diversity (CBD) which was signed by 152 nations, Its recommendations came into effect on 29th Dec, 1993. India became a party to this Convention on Biological Diversity in May, 1994.

29. **(a)**

30. **(a)** Alpha diversity is present within community.

31. **(d)** **32.** **(b)** **33.** **(c)** **34.** **(d)**

35. **(b)** Those species whose populations have been seriously depleted and whose ultimate security is not assured are known as Endangered species.

36. **(b)** **37.** **(c)**

38. **(d)** Chiru is Himalayan Ibex, also called Tibetan Antelope. Shahtoosh is obtained from its neck hair. It is banned under the law.

39. **(c)**

40. **(d)** Nature selects those set of characters that are best adapted to the environment. This has resulted in the great diversity seen in the population of finches.

41. **(d)** **42.** **(b)** **43.** **(b)** **44.** **(d)** **45.** **(b)**

DPP /CB38

1. **(a)** NO_2 and SO_2 after reacting with water in atmosphere produce HNO_3 & H_2SO_4 which fall down as acid rain.

2. **(d)** DDT residues are rapidly passed through food chain causing biomagnification because DDT is liposoluble. Biomagnification, also known as bioamplification or biological magnification, is the increase in concentration of a substance, such as the pesticide DDT, that occurs in a food chain as a consequence of:
-Persistence (slow to be broken down by environmental processes)
-Food chain energetics
-Low (or non-existent) rate of internal degradation/excretion of the substance
(often due to water-insolubility).

3. **(d)** Silicosis is caused by exposure to dust containing silica.

4. **(d)** In secondary treatment mainly settled sewage flows to an aerobic biological treatment stage where it comes into contact with micro-organisms which remove and oxidise most of the remaining organic pollutants.

5. **(c)** Biochemical Oxygen Demand (BOD) in river water increases when sewage gets mixed with river water. Biochemical oxygen demand or biological oxygen demand (BOD) is a chemical procedure for determining how fast biological organisms use up oxygen in a body of water. It is used in water quality management and assessment, ecology and environmental science. BOD is considered as an indication of the quality of a water source.

6. **(d)** **7.** **(a)** **8.** **(a)**

9. **(b)** Ozone layer is present in the stratosphere in the atmosphere of the earth. It protects the earth from UV rays (less than 300 nm). Hole in the ozone layer means thining of ozone layer that allows harmful UV rays to reach earth which cause skin diseases.

10. **(a)** Lots of urea and phosphate fertilizer were used in the crops in the vicinity and the lake water turned green and stinky. Due to this, lake near a village suffered heavy mortality of fishes within a few days.

11. **(c)** If natural habitat is destroyed, wild life is affected worstly.

12. **(c)**

13. **(d)** The correct acronym is IUCN, International Union for Conservation of Nature and Natural resources.

14. **(b)** Photochemical smog is made by the deposition of dust & carbon particles on the pollutant gases and water vapours. The gases found in photochemical smog are NO_2, PAN, O_3 etc.

15. **(a)** Due to dumping of huge amount of sewage, the oxygen levels are depleted, which are reflected in terms of BOD values of water. The number of microbes also increases tremendously and these also consume most of the oxygen. Thus BOD of the river water will increase.

16. **(c)** Primary pollutants perist in the form they are released in the environment. Secondary pollutants are formed by reaction amongst the primary pollutants. Secondary pollutants are more toxic than primary pollutants. So, DDT is a primary pollutant.

17. **(c)** Bhopal gas tragedy, the world's worst industrial catastrophes was not due to radioactive fallout, but it was because of leakage of phosgene and methyl isocyanate gas.

18. **(b)** Lichens are indicators of air polution, especially of the concentration of sulphur dioxide in the atmosphere. Air pollutants dissovled in rain water, mainly sulphur dioxide can damage lichens and prevent them from growing. So, lichens are natural indicators of air pollution.

19. (b) Noise pollution causes anxiety, stress and irritability. Adernaline hormone is released when body is under stress. So noise pollution leads to secretion of adernaline hormone, which provides added energy to the body to deal the stressful situation.

20. (b)

21. (a) In the given pie diagram, greenhouse gases are shown. 'A' is CO_2 which is produced due to deforestation and large scale combustion of fossil fules. 'B' is CH_4 which is produced by incomplete biogas combustion and is the major constituent of biogas. 'C' is water vapour.

22. (b) Ultraviolet radiations are of three types - UV - C (100) - 280 nm), UV - B (280 - 320 nm) and UB - A (320 - 390 nm). UV radiation of wavelengths shorter than UV-B, are almost completely absorbed by earth's atmosphere, given that the ozone layer is intact. But, UV-B damages DNA and mutation may occur. It causes aging of skin, damage to skin cells and various types of skin cancers.

23. (b) In Jhum cultivation crops are cultivated for 2-3 years without manuring. It results in nutrient depletion, reduced moisture retention of soil and increased soil erosion.

24. (b) 25. (c) 26. (d) 27. (b)

28. (c) Yellowing and blackening of Taj Mahal at Agra is due to SO_2 and other pollutants released by Mathura refinery.

29. (b) 30. (b) 31. (c) 32. (a) 33. (d) 34. (a)

35. (a) The 'Jhum cultivation' is also known as 'Slash and burn agriculture'.

36. (c)

37. (a) Unlike domestic sewage, waste water from industries like petroleum, paper manufacturing, metal extraction and processing, chemical manufacturing, etc. often contain toxic substances, notably heavy metals (defined as elements with density > $5g/cm^3$); such as mercury, cadmium, copper, lead etc.) and a variety of organic compounds.

38. (b) DDT causes egg shell thinning in birds because it inhibits calcium ATPase.

39. (b) Friends of the Arcata Marsh (FOAM) is a non-profit organization which for the last twenty years has advanced knowledge and educated the public about treatment and reuse of wastewater. The purpose of the FOAM is to stimulate understanding of the Arcata Marsh and Wildlife Sanctuary, its relationship with Arcata's integrated wastewater treatment system, the surrounding watersheds and bay, and their link with the earth's water cycle.

40. (d) The green house effect is a naturally occuring phenomenon that is responsible for heating of Earth's surface and atmosphere. Without a green house effect, the average temperature at earth's surface would have been around – 18°C, rather than the present average of +15°C.

41. (a) The presence of a large amount of nutrients in water causes excessive growth of planktons or free-floating algae to produce algal bloom. Such algal blooms deteriorate the quality of water, cause the mortality of fishes and impart distinct colour to water bodies.

42. (b) A : Catalytic converter is a device incorporated in the exhaust system of a motor vehicle, containing a catalyst for converting pollutant gases into less harmful ones. As the exhaust passes through the converter, unburnt hydrocarbons are converted into carbon dioxide, water, carbon monoxide and nitric oxide are changed to carbon dioxide and nitrogen gas respectively.
B : Electrostatic precipitator is a device that removes suspended dust particles from a gas or exhaust by applying a high-voltage electrostatic charge and collect the particles on charged plates.
C : Earmuffs is a pair of soft fabric coverings, connected by a band across the top of the head, that are worn over the ears to protect them from cold or high noise level.
D : Land - fill is a site for the disposal of solid waste in which refuse is buried between layers of dirt so as to fill in or reclaim low-lying ground.

43. (a) Electrostatic precipitator is a device that removes suspended dust particles from a gas or exhaust by applying a high-voltage electrostatic charge and collecting the particles on charged plates. In the given diagram of electrostatic precipitator, the parts marked as A, B and C are respectively discharge corona, negatively charged ions, and collection plate grounded.

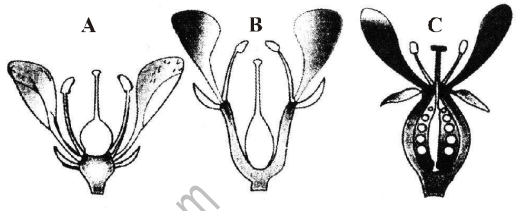
44. (d)

45. (a) An algal bloom is a rapid increase in the population of phytoplankton algae in an aquatic system. Typically only one or a few species are involved and the bloom is recognized by discoloration of the water resulting from the high density of pigmented cells.

Mock Test Full Syllabus Biology

SECTION 1 - BOTANY

1. A taxon is
   (a) a group of related families
   (b) a group of related species
   (c) a type of living organisms
   (d) a taxonomic group of any ranking
2. Peat moss is another name of
   (a) *Sphagnum* (b) *Marchantia*
   (c) *Riccia* (d) *Dryopteris*
3. In fern, spores are formed in
   (a) sporangium (b) oogonium
   (c) archegonium (d) stomium
4. Which one of the following is a true fruit?
   (a) Apple (b) Pear
   (c) Cashew nut (d) Coconut
5. The cork cambium, cork and secondary cortex are collectively called
   (a) phelloderm (b) phellogen
   (c) periderm (d) phellem
6. Which of the following algae are suitable for human consumption?
   (a) *Laminaria* and *Fucus*
   (b) *Gracilaria* and *Chondrus*
   (c) *Porphyra* and *Spirogyra*
   (d) *Rhodymania* and *Porphyra*
7. Choose the correct option.
   (i) Lysosomes are double membranous vesicles budded off from Golgi apparatus and contain digestive enzymes.
   (ii) Endoplasmic reticulum consists of a network of membranous tubule and helps in transport, synthesis and secretion.
   (iii) Leucoplasts are bound by two membranes, lack pigment but contain their own DNA and protein synthesising machinery.
   (iv) Sphaerosomes are single membrane bound organelle which are associated with synthesis and storage of lipids.
   (a) (i) only (b) (i) and (ii)
   (c) (ii), (iii) and (iv) (d) All of these
8. Chosse the correct combinations.



   I. Hypogynous flower
   II. Perigynous flower
   III. Epigynous flower
   (a) A - I, B - II, C - III (b) A - I, B - III, C - II
   (c) A - III, B - II, C - I (d) A - III, B - I, C - II
9. Which one of the following is not a method of vegetative propagation?
   (a) Budding (b) Layering
   (c) Sowing (d) Tissue culture
10. Entry of pollen tube through micropyle is
   (a) Chalazogamy (b) Mesogamy
   (c) Porogamy (d) Pseudogamy
11. Competition for light, nutrients and space is most severe between
   (a) closely related organism growing in different habitats
   (b) closely related organisms growing in the same habitat
   (c) distantly related organisms growing in the same habitat
   (d) distantly related organisms growing in different habitats
12. In oogamy, fertilization involves
   (a) a small non-motile female gamete and a large motile male gamete
   (b) a large non-motile female gamete and a small motile male gamete
   (c) a large non-motile female gamete and a small nonmotile male gamete
   (d) a large motile female gamete and a small nonmotile male gamete

13. Photochemical smog formed in congested metropolitan cities mainly consists of
(a) Ozone, peroxyacetyl nitrate and NO_X
(b) Smoke, peroxyacetyl nitrate and SO_2
(c) Hydrocarbon, SO_2 and CO_2
(d) Hydrocarbon, ozone and SO_X

14. The electrostatic precipitator is used for removing particulate matter from
(a) Exhaust of the thermal power plant
(b) Exhaust from the automobiles
(c) Industrial effluents
(d) Kitchen waste

15. Keystone species in an ecosystem are those
(a) present in maximum number
(b) that are most frequent
(c) attaining a large biomass
(d) contributing to ecosystem properties

16. Initiation codon of protein synthesis (in eukaryotes) is
(a) GUA (b) GCA
(c) CCA (d) AUG

17. What is the best pH of soil for cultivation of plants ?
(a) 3.4 – 5.4 (b) 6.5 – 7.5
(c) 4.5 – 8.5 (d) 5.6 – 6.5

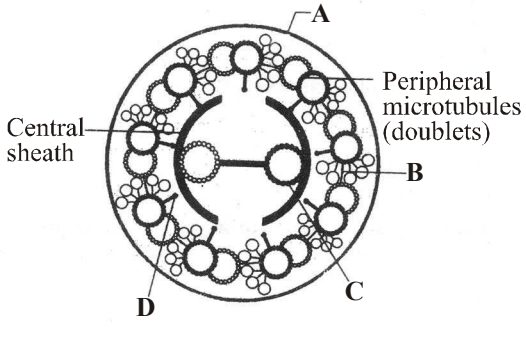
18. Telomerase is an enzyme which is a
(a) simple protein (b) RNA
(c) ribonucleoprotein (d) repetitive DNA

19. Mass of living matter at a trophic level in an area at any time is called
(a) standing crop (b) deteritus
(c) humus (d) standing state

20. The *Triticale* is an intergeneric hybrid between :
(a) wheat and maize (b) maize and rye
(c) wheat and rye (d) bajra and wheat

21. Which one is a neem product used as insect repellent?
(a) Azadirachtin (b) Rotenone
(c) Parathione (d) Endrin

22. Choose the correct option.



(a) A – Plasma membrane, B – Interdoublet bridge, C – Central microtubule, D – Radial spoke
(b) A – Plasma membrane, B – Arm, C – Central microtubule, D – Radial spoke
(c) A – Plasma membrane, B – Interdoublet bridge, C – Hub, D – Radial spoke
(d) A – Plasma membrane, B – Interdoublet bridge, C – Hub, D – Arm

23. An ecosystem which can be easily damaged but can recover after some time if damaging effect stops will be having
(a) low stability and high resilience
(b) high stability and low resilience
(c) low stability and low resilience
(d) high stability and high resilience

24. The mode of catching insects in *Drosera* plants is by means of
(a) sensitive glandular hairs which secrete a sweet, viscous, shining substance.
(b) specially sensitive trigger hairs.
(c) leaves which are modified into pitcher.
(d) leaf segments modified into bladder.

25. Quantasomes are present in
(a) chloroplast (b) mitochondria
(c) golgi body (d) lysosome

26. The water potential and osmotic potential of pure water are
(a) zero and zero (b) 100 and 100
(c) zero and 100 (d) 100 and zero

27. Photorespiration is favoured by
(a) high O_2 and low CO_2
(b) low light and high O_2
(c) low temperature and high O_2
(d) low O_2 and high CO_2

28. A free living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern *Azolla* is
(a) *Tolypothrix* (b) *Chlorella*
(c) *Nostoc* (d) *Anabaena*

29. Hydroponics is
(a) nutrient less culture
(b) water less culture
(c) soilless culture
(d) None of these

30. Krebs cycle occurs in
(a) mitochondria (b) cytoplasm
(c) chloroplasts (d) ribosomes

31. Most abundant organic compound on earth is
(a) Protein (b) Cellulose
(c) Lipids (d) Steroids

32. Terminal cytochrome of respiratory chain which donates electrons to oxygen is
(a) Cyt. b (b) Cyt. c
(c) Cyt. a_1 (d) Cyt. a_3

33. To avoid excessive water loss during severe drought stress, the closure of stomata is signalled by the production of
(a) IAA (b) NAA
(c) ABA (d) IBA

34. In short day plants, flowering is induced by
(a) photoperiod less than 12 hours.
(b) photoperiod below a critical length and uninterrupted long night.
(c) long night.
(d) short photoperiod and interrupted long night.

35. The major reason that glycolysis is not as energy productive as respiration is that
(a) NAD^+ is regenerated by alcohol or lactate production, without the high-energy electrons passing through the electron transport chain.
(b) it is the pathway common to fermentation and respiration.
(c) it does not take place in a specialized membrane-bound organelle.
(d) pyruvate is more reduced than CO_2; it still contains much of the energy from glucose.

36. The catalytic efficiency of two different enzymes can be compared by the
(a) formation of the product
(b) pH optimum value
(c) K_m value
(d) molecular size of the enzyme

37. Biodiversity Act of India was passed by the parliament in the year
(a) 1992 (b) 1996
(c) 2000 (d) 2002

38. 'Axenic culture' is
(a) culture of tissue
(b) growing of shrubs
(c) growing of tall trees
(d) culture of tissue free from contamination

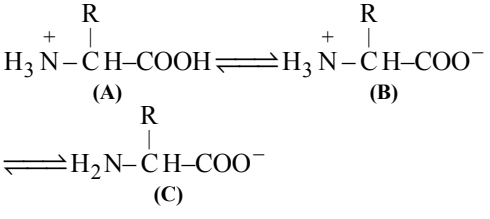
39. Which one thing is not true about antibiotics?
(a) The term "antibiotic" was coined by Selman Waksman in 1942
(b) First antibiotic was discovered by Alexander Flemming
(c) Each antibiotic is effective only against one particular kind of germ
(d) Some persons can be allergic to a particular antibiotic

40. Main objective of production/use of herbicide resistant GM crops is to
(a) eliminate weeds from the field without the use of manual labour
(b) eliminate weeds from the field without the use of herbicides
(c) encourage eco-friendly herbicides
(d) reduce herbicide accumulation in food articles for health safety

41. The common nitrogen fixer in paddy fields is
(a) *Rhizobium* (b) *Azospirillum*
(c) *Oscillatoria* (d) *Frankia*

42. In order to obtain virus- free plants through tissue culture, the best method is
(a) protoplast culture (b) embryo rescue
(c) anther culture (d) meristem culture

43. Which one of the following is a wrong matching?
(a) Somatic hybridization - Fusion of two diverse cells
(b) Vector DNA -Site for t-RNA synthesis
(c) Micropropagation - *in vitro* production of plants in large numbers
(d) Callus - Unorganised mass of cell produced in tissue culture

44. 

Which of the above is Zwitterionic form?
(a) A (b) C
(c) B (d) All of these

45. Restriction endonucleases are enzymes which
(a) make cuts at specific positions within the DNA molecule
(b) recognize a specific nucleotide sequence for binding of DNA ligase
(c) restrict the action of the enzyme DNA polymerase
(d) remove nucleotides from the ends of the DNA molecule

SECTION 2 - ZOOLOGY

46. Sex factor in bacteria is
(a) Chromosomal replicon
(b) F-replicon
(c) RNA
(d) Sex-pilus

47. Animals/organisms floating on the surface of water are
(a) plankton (b) pelagic
(c) benthos (d) neritic

48. The cell junctions called tight, adhering and gap junctions are found in
(a) connective tissue (b) epithelial tissue
(c) neural tissue (d) muscular tissue

49. Spleen is referred to as
(a) temporary endocrine gland
(b) graveyard of RBC
(c) largest gland
(d) store house of WBC

50. Given below are four matchings of an animal and its kind of respiratory organ :
(i) Silver fish – trachea
(ii) Scorpion – book lung
(iii) Sea squirt – pharyngeal gills
(iv) Dolphin – skin
The correct matchings are
(a) (iii) and (iv) (b) (i) and (iv)
(c) (i), (ii) and (iii) (d) (ii) and (iv)

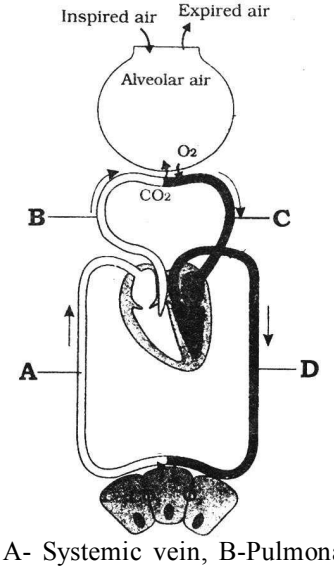
51. In the mouthparts of the cockroach, the organ of mastication is
(a) labium (b) maxillae
(c) mandibles (d) labrum

52. Which one of the following characters is not typical of the class Mammalia?
(a) Thecodont dentition
(b) Alveolar lungs
(c) Ten pairs of cranial nerves
(d) Seven cervical vertebrae

53. Natural parthenogenesis occurs in:
(a) Protozoans (b) Earthworm
(c) All insects (d) Honeybee

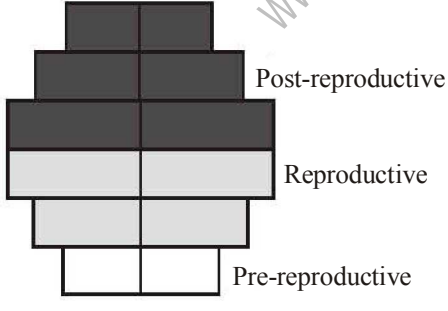
54. Consider the statements given below regarding contraception and answer as directed thereafter:
(i) Medical Termination of Pregnancy (MTP) during first trimester is generally safe
(ii) Generally chances of conception are nil until mother breast-feeds the infant upto two years
(iii) Intrauterine devices like copper-T are effective contraceptives
(iv) Contraception pills may be taken upto one week after coitus to prevent conception
Which two of the above statements are correct?
(a) ii and iii (b) iii and iv
(c) i and iii (d) i and ii

55. Identify the blood vessels A to D.



(a) A- Systemic vein, B-Pulmonary artery, C-Pulmonary vein, D-Systemic artery
(b) A-Systemic artery, B-Pulmonary artery, C- Pulmonary vein, D- Systemic vein
(c) A-Pulmonary artery, B-Systemic vein, C-Pulmonary vein, D- Systemic artery
(d) A-Systemic vein, B-Pulmonary vein, C- Pulmonary artery, D- Systemic artery

56. Which pathway of the male reproductive system is correct for the sperms transportation?
    (a) Vas efferentia→Vas deferens→Epididymis
    (b) Vas deferens→Epididymis→Seminal vesicle
    (c) Epididymis→Vas deferens→Urethra
    (d) Rete testis→Epididymis→Vas efferentia
57. The second maturation division of the mammalian ovum occurs:
    (a) in the Graafian follicle following the first maturation division
    (b) Shortly after ovulation before the ovum makes entry into the fallopian tube
    (c) Until after the ovum has been penetrated by a sperm
    (d) Until the nucleus of the sperm has fused with that of the ovum
58. A force acting against achievement of highest possible level of population growth is
    (a) Carrying capacity
    (b) Environment resistance
    (c) Population pressure
    (d) Saturation level
59. The phase of menstrual cycle in humans that lasts for 7-8 days, is
    (a) follicular phase (b) ovulatory phase
    (c) luteal phase (d) menstruation
60. What type of human population is represented by the following age pyramid?



    (a) Vanishing population
    (b) Stable population
    (c) Declining population
    (d) Expanding population
61. The 'Mule' is the result of
    (a) Inbreeding depression
    (b) Out breeding
    (c) Cross breeding
    (d) Inter-specific hybridization
62. Haemophilia is more common in males because it is a
    (a) Recessive character carried by Y–chromosome
    (b) Dominant character carried by Y-chromosome
    (c) Dominant trait carried by X-chromosome
    (d) Recessive trait carried by X-chromosome
63. Theory of inheritance of acquired characters was given by
    (a) Wallace (b) Lamarck
    (c) Darwin (d) De Vries
64. The animal husbandry deals with the care, breeding and management of
    (a) Domesticated animals
    (b) Fishes
    (c) Honey bees and silk worms
    (d) All of these
65. 'Inland fishery' refers to
    (a) Culturing fish in fresh water
    (b) Trapping and capturing fishes from sea coast
    (c) Deep sea fishing
    (d) Extraction of oil from fishes
66. The most popular breed of fowl in India is
    (a) White leg horn (b) Aseel
    (c) Plymouth (d) Langshan
67. Which of following teeth are lophodont?
    (a) Incisor and canine
    (b) Premolar and molar
    (c) Canine and premolar
    (d) Premolar and incisor
68. Pacemaker of heart is
    (a) AV node (b) Bundle of His
    (c) SA node (d) Purkinje fibres
69. Uricotelism is found in
    (a) Frogs and toads
    (b) Mammals and birds
    (c) Birds, reptiles and insects
    (d) Fishes and fresh water protozoans
70. A large proportion of oxygen is left unused in the human blood even after its uptake by the body tissues. This O_2
    (a) acts as a reserve during muscular exercise
    (b) raise the pCO_2 of blood to 75 mm of Hg.
    (c) is enough to keep oxyhaemoglobin saturation at 96%
    (d) helps in releasing more O_2 to the epithelial tissues.

71. The basic functional unit of the human kidney is
(a) nephron (b) nephridia
(c) pyramid (d) Henle's loop

72. Urea from the blood can be removed by
(a) Uremia (b) Diuresis
(c) Dialysis (d) Micturition

73. Which one of the following correctly explains the function of a specific part of a human nephron ?
(a) Podocytes : create minute spaces (slite pores) for the filtration of blood into the Bowman's capsule.
(b) Henle's loop : most reabsorption of the major substances from the glomerular filtrate.
(c) Distal convoluted tubule : reabsorption of K^+ ions into the surrounding blood capillaries.
(d) Afferent arteriole : carries the blood away from the glomerular towards renal vein.

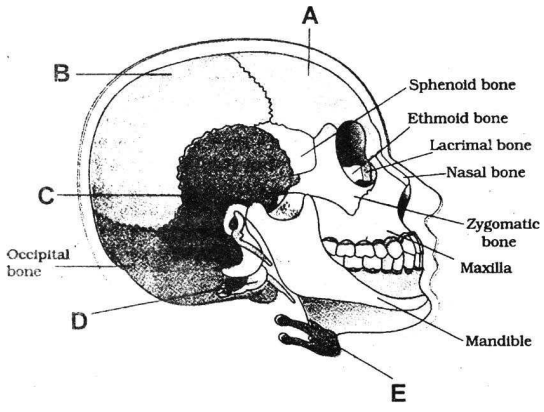
74. The nerve centres which control the body temperature and the urge for eating are contained in:
(a) hypothalamus (b) pons
(c) cerebellum (d) thalamus

75. Rods and cones of eyes are modified
(a) multipolar neuron
(b) unipolar neuron
(c) bipolar neuron
(d) None of these

76. Which of the following is both exocrine and endocrine gland ?
(a) Liver (b) Pancreas
(c) Thyroid (d) Adrenal

77. The sensation of fatigue in the muscles after prolonged strenuous physical work, is caused by
(a) a decrease in the supply of oxygen
(b) minor wear and tear of muscle fibres
(c) the depletion of glucose
(d) the accumulation of lactic acid

78. Consider the diagram given below



Identify the labelled parts as A, B, C, D and E respectively.
(a) Frontal bone, Parietal bone, Temporal bone, Occipital condyle and Hyoid bone
(b) Frontal bone, Temporal bone, Parietal bone, Occipital condyle and Hyoid bone
(c) Frontal bone, Parietal bone, Temporal bone, Hyoid bone and Occipital condyle
(d) Parietal bone, Frontal bone, Temporal bone, Occipital condyle and Hyoid bone

79. Which one of the following statements is incorrect ?
(a) The presence of non-respiratory air sacs, increases the efficiency of respiration in birds.
(b) In insects, circulating body fluids serve to distribute oxygen to tissues.
(c) The principle of countercurrent flow facilitates efficient respiration in gills of fishes.
(d) The residual air in lungs slightly decreases the efficiency of respriration in mammals.

80. Which one of the following does not act as a neurotransmitter ?
(a) Epinephrine (b) Norepinephrine
(c) Cortisone (d) Acetylcholine

81. Which one of the following statements is correct?
(a) Neurons regulate endocrine activity, but not *vice versa*.
(b) Endocrine glands regulate neural activity and nervous system regulates endocrine glands.
(c) Neither hormones control neural activity nor the neurons control endocrine activity.
(d) Endocrine glands regulate neural activity but not *vice versa*.

82. 'Cloning' is meant for/to
    (a) production of hGH gene in *E. coli*
    (b) preserve the genotype of organism
    (c) replace the original gene
    (d) All of the above
83. A cell coded protein formed in response to infection with most animal viruses is
    (a) Antigen (b) Antibody
    (c) Interferon (d) Histone
84. Which one of the following is not used in organic farming?
    (a) *Glomus* (b) Earthworm
    (c) *Oscillatoria* (d) Snail
85. ELISA is used to detect viruses where the key reagent is
    (a) RNase
    (b) alkaline phosphatase
    (c) catalase
    (d) DNA probe
86. Vitamin B_{12} is formed during fermentation of
    (a) *Ashloya gossipii*
    (b) *Rhizopus stolonifer*
    (c) *Propionibacteria*
    (d) *Saccharomyces cerevisiae*
87. Which one is a correctly match sexually transmitted disease with its pathogen?
    (a) Syphilis – *Leishmania donovani*
    (b) AIDS – *Bacillus anthracis*
    (c) Urethritis – *Entamoeba gingivalis*
    (d) Gonorrhoea – *Neisseria gonorrhoeae*
88. Which one of the following depresses brain activity and produced feelings of calmness, relaxation and drowsiness?
    (a) Morphine (b) Valium
    (c) Amphetamines (d) Hashish
89. Which one of the following is correctly matched pair of the given secretion and its primary role in human physiology?
    (a) Sebum — Sexual attraction
    (b) Sweat — Thermoregulation
    (c) Saliva — Tasting food
    (d) Tears — Excretion of salts
90. Consider the following four statements (i-iv) and select the option which includes all the correct ones only.
    (i) Single cell *Spirulina* can produce large quantities of food rich in protein, minerals, vitamins etc.
    (ii) Body weight-wise the micro-organism *Methylophilus methylotrophus* may be able to produce several times more proteins than the cows per day.
    (iii) Common button mushrooms are a very rich source of vitamin C.
    (iv) A rice variety has been developed which is very rich in calcium.
    (a) Statements (ii) and (iv)
    (b) Statements (i), (iii) and (iv)
    (c) Statements (ii), (iii) and (iv)
    (d) Statements (i) and (ii)

ANSWER KEY																	
1	(d)	**11**	(b)	**21**	(a)	**31**	(b)	**41**	(b)	**51**	(c)	**61**	(d)	**71**	(a)	**81**	(a)
2	(a)	**12**	(b)	**22**	(a)	**32**	(d)	**42**	(d)	**52**	(c)	**62**	(d)	**72**	(c)	**82**	(b)
3	(a)	**13**	(a)	**23**	(a)	**33**	(c)	**43**	(b)	**53**	(d)	**63**	(b)	**73**	(a)	**83**	(c)
4	(d)	**14**	(a)	**24**	(a)	**34**	(b)	**44**	(c)	**54**	(c)	**64**	(d)	**74**	(a)	**84**	(d)
5	(c)	**15**	(d)	**25**	(a)	**35**	(d)	**45**	(a)	**55**	(a)	**65**	(a)	**75**	(b)	**85**	(b)
6	(d)	**16**	(d)	**26**	(a)	**36**	(c)	**46**	(b)	**56**	(c)	**66**	(a)	**76**	(b)	**86**	(c)
7	(c)	**17**	(b)	**27**	(a)	**37**	(d)	**47**	(a)	**57**	(c)	**67**	(b)	**77**	(d)	**87**	(d)
8	(a)	**18**	(c)	**28**	(d)	**38**	(d)	**48**	(b)	**58**	(b)	**68**	(c)	**78**	(a)	**88**	(b)
9	(c)	**19**	(a)	**29**	(c)	**39**	(c)	**49**	(b)	**59**	(b)	**69**	(c)	**79**	(b)	**89**	(b)
10	(c)	**20**	(c)	**30**	(a)	**40**	(d)	**50**	(c)	**60**	(c)	**70**	(a)	**80**	(c)	**90**	(d)

HINTS & SOLUTIONS

SECTION 1 - BOTANY

2. (a) Peat moss is another name for *Sphagnum*. It is also known as famine food in China.

4. (d) The fruit is a mature or ripened ovary. When a fruit develops exclusively from the ovary, it is said to be true fruit. When in addition to the ovary, some other floral part also participates in the formation of fruits, then it is known as false fruit. Apple, pear, cashewnut, mulberry etc. are all false fruits.

5. (c) Phellem, phellogen and phelloderm are collectively called periderm.

10. (c) In porogamy the tip of pollen tube enters the micropyle, pushes through the nucellar tissue & finally pierces the egg-apparatus end of the embryo sac. If pollen tube enters through chalazal side it is called chalazogamy & if it enters laterally it is called mesogamy.

11. (b) Competition is most severe between the members of a population belonging to same habitat.

12. (b) In oogamy male and female gametes are morphologically as well as physiologically different. Female gametes are large and non-motile. Male gametes are small but motile.

15. (d) The keystone species in an ecosystem are those who are the main contributors to the ecosystem.

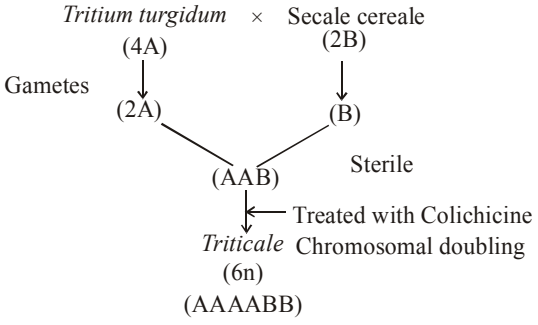
16. (d) The initiation codon is the codon which initiates the protein synthesis. They are AUG for methionine and GUG for valine.

17. (b) The best pH of soil for cultivation of plants is 6.5 – 7.5.

18. (c) Telomerase is a ribonucleoprotein which synthesize the rich strand of telomers in DNA. **Telomerase** is an enzyme that adds specific DNA sequence repeats ("TTAGGG" in all vertebrates) to the 3' ("three prime") end of DNA strands in the telomere regions, which are found at the ends of eukaryotic chromosomes. The telomeres contain condensed DNA material, giving stability to the chromosomes. The enzyme is a reverse transcriptase that carries its own RNA molecule, which is used as a template when it elongates telomeres, which are shortened after each replication cycle. Telomerase was discovered by Carol W. Greider in 1984.

19. (a) A standing crop is the quantity or total weight or energy content of the organism, which are in a particular location at a particular time.

20. (c) *Triticale* is a man made hexaploid inter genetic hybrid.



21. (a) Azadirachtin is a chemical compound belonging to the limonoids. It is a secondary metabolite present in the neem tree seeds. The molecular formula is $C_{35}H_{44}O_{16}$. Azadirachtin is a highly oxidised tetranortriterpenoid which boasts a plethora of oxygen functionality, comprising an enol ether, acetal, hemiacetal, and tetra-substituted oxirane as well as a variety of carboxylic esters. It is classified among the plant secondary metabolites.

23. (a) An ecosystem having low stability can be easily damaged. An ecosystem having high resilience will take less time to recover.

26. (a) Osmotic potential is the potential of a solution to cause water movement into it across a semi- permeable membrane. Water potential is the tendency of water to leave a system.

27. (a) Photorespiratory loss of CO_2 occurs when RuBisCo starts functioning as an oxygenase instead of carboxylase under conditions of high O_2 and low CO_2. It involves three organelles chloroplast, mitochondria and peroxisomes. Half of the photosynthetically fixed carbon (in the form of RuBP) may be lost into the atmosphere through this process and no ATP formation occurs.

29. (c) Cultivation of plants by placing the roots in the nutrient solution without any soil is called hydroponics. It is also known as soilless culture/ water culture/ solution culture. It is used to determine which elements are essential for plant growth and what symptoms are produced by the absence or deficiency of essential elements.

30. (a) The enzyme involved in Krebs cycle are localized in the mitochondrial matrix.

31. (b) Cellulose is the most abundant organic compound, most abundant polysaccharide and most abundant biopolymer found on earth.

32. (d) Terminal cytochorome is cyt a_3. cyt a_3 posseses two copper centers. It helps in transfer of electrons to oxygen.

36. (c) K_m (Michealis Menten constant) is defined as that substrate concentration at which under optimum conditions the rate of an enzyme catalysed reaction reaches half the maximum rate. K_m is inversely proportional to affinity of enzyme for its substrate.

37. (d) Biodiversity Act of India was passed by the parliament in the year 2002.

38. (d) Axenic is a method of culture of isolated plant cells, tissues or organs in an artificial, nutritive medium.

39. (c) 'Each antibiotic is effective only against one particular kind of germ' is not correct.

40. (d) Main objective of production/use of herbicide resistant GM crops is to reduce herbicide accumulation in food articles for health safety. GM plants has been useful in many ways. Genetic modifications has made crops more tolerant to abiotic stresses, reduced reliance on chemical pesticides, enhanced nutritional value of food.

41. (b) The common nitrogen fixer in paddy field is *Azospirillum.* It is an anaerobic bacteria that forms loose association with roots of paddy crops.

42. (d) In order to obtain virus-free plants through tissue culture, the best method is meristem culture. Meristem tip culture is used successfully to remove viruses, bacteria, in order to produce the greatest number of plants. Meristem culture is used to produce

healthy propagation stock for crops and ornamentals.

43. (b) Vector DNA are the DNA molecules that can carry a foreign DNA segment and replicate inside the host cells. Vector DNA may be plasmids, a bacteriophage, cosmids, yeast artificial chromosomes.

45. (a) Restriction endonucleases are enzymes that makes cuts at specific positions within the DNA molecule. They acts as molecular scissors. They recognise specific base sequence at palindrome sites in DNA duplex and cut its strands.

SECTION 2 - ZOOLOGY

46. (b) Sex-factor or F-factor in bacteria results in high frequency conjugation. It allows bacteria to produce sex pilus necessary for conjugation.

47. (a) Organisms passively floating on the surface of water are planktons. If floating organisms are animals then it is zooplanktons and if plants– phytoplanktons.

48. (b) The cell junctions called tight, adhering and gap junctions are found in epithelial tissue. Epithelial tissue covers the whole surface of the body. It is made up of cells closely packed and ranged in one or more layers.

50. (c) Dolphin is an aquatic mammal and breathes through lungs.

52. (c) Mammals have 12 pairs of cranial nerves.

54. (c) Statements i and iii are correct.

- Medical Termination of Pregnancy (MTP) during first trimester is generally safe.

- Intrauterine device like copper-T are effective contraceptives.

56. (c) Epididymis lies between vas efferens and vas deferens.

59. (b) In menstrual cycle, menstrual phase lasts for 4 days, proliferating/ovulating phase for about 10 days and secretory phase for 14 days.

60. (c) This age pyramid represents the declining population of any organism. Population decline is the reduction over time in region's census. It can be caused for several reasons that includes heavy immigration disease, famine or sub-replacement fertility.

62. (d) Haemophilia is a sex linked recessive trait carried by X chromosome (also known as bleeder's disease).

63. (b) One of the first attempts to explain the mechanism of evolution was made by Jean Baptiste de Lamarck. His theory was Inheritance of Acquired Characters. The theory states that the characters acquired during life time are passed on to the progeny and then to subsequent generations and new species are produced.

66. (a) White leg horn is a mediterranean breed.

67. (b) Premolar and molar are lophodont teeth. Lophodont teeth with the cusps elongated to form narrow ridges. The molars in elephants and horses have cusps fused by means of intermediate masses of dentine to form ridges or lophs.

68. (c) Sino-Auricular node (S A node) present in the walls of right auricle has a myogenic initiation of heartbeat in a regular fashion and controls the pace of heartbeat called pacemaker.

70. (a) A large portion of oxygen is left unused in the human blood even after its uptake by the body tissues. This O_2 acts as a reserve during muscular exercise.

73. (a) Glome podocytes are highly specialized cells with a complex cytoarchitecture plays a major role in establishing the selective permeability of glomerular filtration barrier.

74. (a) Hypothalamus contains important nerve centres that controls the body temperature, thirst, hunger and eating, water balance and sexual function.

76. (b) Pancreas is a gland which is both exocrine and endorine. Cells of acini are exocrine which secrete enzymes and islet of Langerhans part is endocrine which

secretes hormones like insulin, glucagon, *etc*.

77. (d) The sensation of fatigue in the muscles after prolonged strenuous physical work is caused by the accumulation of lactic acid.

80. (c) Epinephrine or adrenaline, norepinephrine or noradrenaline and acetylchloline are the neurotransmitters. These are released by the nerve fibres to transmit the impulse to the next neuron. Cortisone is not the neurotransmitter.

81. (a) Neurons regulate endocrine activity, but not *vice-versa*.Neurons in the hypothalamus secrete thyroid releasing hormone (TRH), which stimulates cells in the anterior pituitary to secrete thyroid-stimulating hormone (TSH).

82. (b) Cloning is the production of an organism with exactly similar genetic make up as in the mother individual. Cloning is done to preserve genotype of an individual. This is achieved by cell culture, tissue culture or genetic engineering.

83. (c) A special defence system works specially against viral infection. It has no effect on micro-organism. Cells invaded by a virus produce an antiviral protein called interferon (IFN). The latter is released from the infected cell and on reaching the nearby non-infected cells it makes them resistant to the virus infection.

84. (d) Organic farming involves use of organic wastes and other biological material along with beneficial microbes to release nutrients to crop to increase the soil fertility in an ecofriendly, and pollution free environment. *Glomus,* earthworm and *Oscillatoria* can be used in organic farming while snail cannot.

85. (b) ELISA test is a technique which can detect any amount of an antibody or antigen with the help of an enzyme. The commonly used enzymes are alkaline phosphatase and peroxidase.

87. (d) AIDS is caused by HIV virus and Gonorrhoea is caused by *Neisseria gonorrhoea*. Urethritis is inflammed of the urethra by bacteria. Syphilis is caused by *Treponema pallidum*.

88. (b) Amphetamines bring about increased alertness and sleeplessness. Hashish is a hallucinogen. Valium is a tranquilizer. Valium depresses brain activity and produces feeling of calmness, relaxation and drowsiness. Morphine is an opiate narcotic.

89. (b) Thermoregulation is the ability of an organism to keep its body temperature within certain boundaries, even when temperature surrounding is very different. In humans, sweating is primarily a means of thermoregulation.

90. (d) *Spirulina* is SCP rich in protein, vitamins & minerals. 250 gram biomass of *Methylophilus methylotrophus* produces 25tonn protein/day while cow of 250 kg. produces only 200 gm. protein/day.

Common button mushrooms are a very rich source of vitamin D. A rice variety has been developed which is very rich in iron content.