Sample Question Paper-2

BIOLOGY (044) Theory

Class-XI, Session: 2023-24

SOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

i. *All questions are compulsory.*
ii. *The question paper has five sections and 33 questions. All questions are compulsory.*
iii. *Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.*
iv. *There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.*
v. *Wherever necessary, neat and properly labeled diagrams should be drawn.*

Section - A

1. Mark the incorrect statement in context to O_2 binding to Hb: AI 1
   (A) Higher pH **(B)** Lower temperature **(C)** Lower pCO_2 **(D)** Higher pO_2
2. In an inflorescence where flowers are borne laterally in an acropetal succession, the position of the youngest floral bud shall be: **1**
   (A) Proximal **(B)** Distal **(C)** Intercalary **(D)** Anywhere
3. Match the following and choose the correct option from below: **1**

	Column I		Column II
(a)	Cuticle	(i)	Guard cells
(b)	Bulliform cells	(ii)	Single layer
(c)	Stomata	(iii)	Waxy layer
(d)	Epidermis	(iv)	Empty colourless cell

Options :
(A) (a)-iii, (b)-iv, (c)-i, (d)-ii **(B)** (a)-i, (b)-ii, (c)-iii, (d)-iv
(C) (a)-iii, (b)-ii, (c)-iv, (d)-i **(D)** (a)-iii, (b)-ii, (c)-i, (d)-iv

4. It is said that elemental composition of living organisms and that of inanimate objects (like earth's crust) are similar in the sense that all the major elements are present in both. Then what would be the difference between these two groups? Choose a correct answer from among the following: **1**
   (A) Living organisms have more gold in them than inanimate objects.
   (B) Living organisms have more water in their body than inanimate objects.
   (C) Living organisms have more carbon, oxygen and hydrogen per unit mass than inanimate objects.
   (D) Living organisms have more calcium in them than inanimate objects.
5. At which stage of meiosis does the genetic constitution of gametes is finally decided? **1**
   (A) Metaphase I **(B)** Anaphase II **(C)** Metaphase II **(D)** Anaphase I
6. Different cells have different sizes. Arrange the following cells in an ascending order of their size. Choose the correct option among the followings: **1**
   (i) Mycoplasma **(ii)** Ostrich eggs **(iii)** Human RBC **(iv)** Bacteria
   Options:
   (A) i, iv, iii & ii **(B)** i, ii, iii & iv **(C)** ii, i, iii & iv **(D)** iii, ii, i & iv
7. In which of the following pairs epidermis is absent in flowering plants? **1**
   (A) Root tip and shoot tip **(B)** Shoot bud and floral bud
   (C) Ovule and seed **(D)** Petiole and pedicel

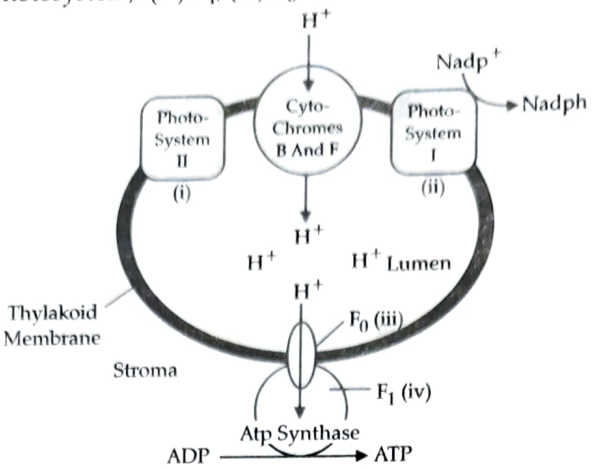
8. Identify the labelled parts in the given diagram. 1

(A) (i)-Photosystem II, (ii)-Photosystem I, (iii)- F_0, (iv)-F_1.

(B) (i)-F_0, (ii)-F_1, (iii)-Photosystem II, (iv)-Photosystem I

(C) (i)-F_1, (ii)-F_0, (iii)-Photosystem-I, (iv)-Photosystem II

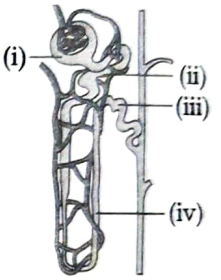
(D) (i)-PhotosystemII, (ii)-Photosystem,I (iii)-F_1, (iv)-F_0.



9. Plants of this group are diploid and well adapted to extreme conditions. They grow seed bearing sporophylls in compact structures called cones. The group in reference is: 1

(A) Monocots **(B)** Dicots **(C)** Pteridophytes **(D)** Gymnosperms

10. Identify from the given diagram, the part which plays a role in maintaining high osmolality of medullary interstitial fluid. 1



(A) (i) **(B)** (ii)

(C) (ii) **(D)** (iv)

11. Viruses are noncellular organisms but replicate themselves once they infect the host cell. To which of the following kingdom do viruses belong to? 1

(A) Monera **(B)** Protista **(C)** Fungi **(D)** None of the above

12. Given below is the diagrammatic representation of a standard ECG.

Which among the following wave represents the depolarisation of the atria? 1

(a) P wave **(b)** QRS Complex. **(c)** T Wave **(d)** Both (a) and (b).

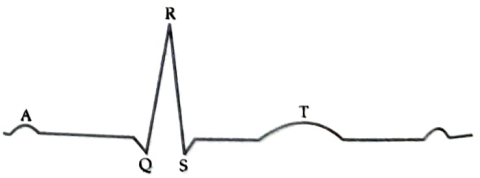
Directions: In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true but Reason (R) is NOT the correct explanation of Assertion (A).

(C) Assertion (A) is true but Reason (R) is false.

(D) Assertion (A) is false but Reason (R) is true.



13. **Assertion (A):** Factors for clotting of blood are also present in the plasma in an active form. 1
Reason (R): Blood without plasma is called serum.

14. **Assertion (A):** Leaves of monocot plants show reticulate venation. 1
Reason (R): When the veinlets form a network, the venation is termed as reticulate venation.

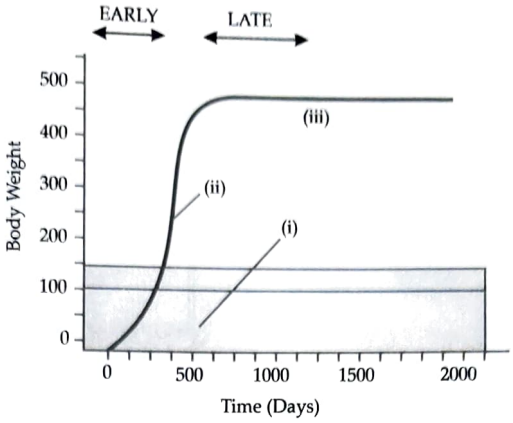
15. **Assertion (A):** All chordates are vertebrates. 1
Reason (R): They possess a notochord, dorsal, hollow nerve cord and have pharyngeal gill clefts in some stage of their life cycle.

16. **Assertion (A):** Some bryophytes are called liverworts. 1
Reason (R): They are called as liverworts because their sporophyte resembles with liver lobes.

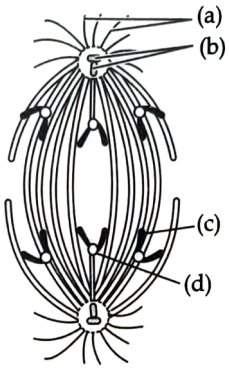
Section - B

17. Differentiate between chlorophyceae and phaeophyceae. 2

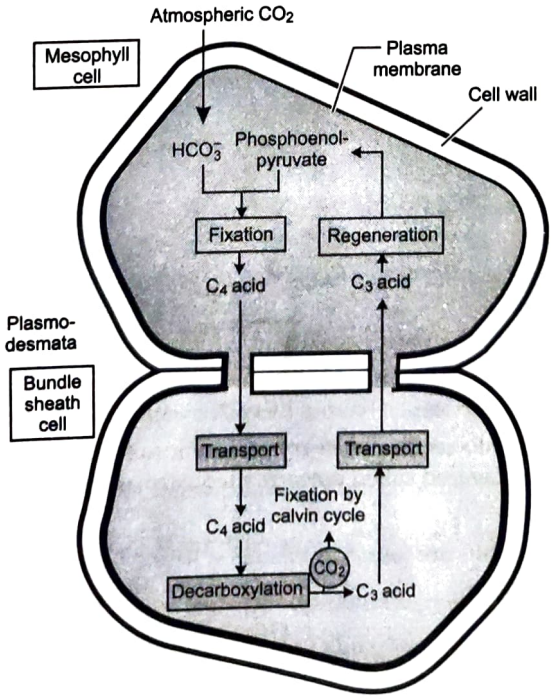
18. **(a)** Identify the type of growth curve from the given graph. A I 2
    (b) Define the following (i), (ii) and (iii).



19. Label the given diagram and identify the given stage. 2



20. Observe the diagram and answer the following. 2

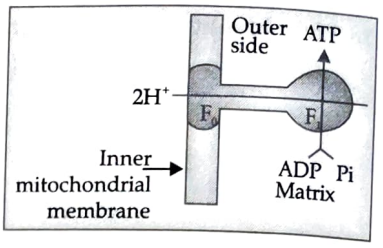


(a) Which group of plants exhibits these two types of cells?
(b) What is the first product of C_4 cycle?

21. Auxin is a plant growth regulator which can be either extracted from plants or synthetically prepared. Write the full form of two synthetic auxins NAA and IBA. Write their uses ? 2

OR

Observe the given diagram and answer the following questions. AI

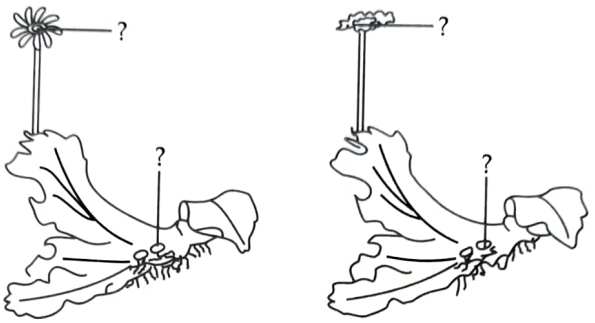


(a) What are the reduced co-enzymes produced in the respiration?

(b) In which part, the enzyme ATP synthase is present?

Section - C

22. AI 3



(a) Identify the given diagram and label the given parts .

(b) Locate and define Rhizoids.

23. How nerve impulses are conducted in non-myelinated nerves ?

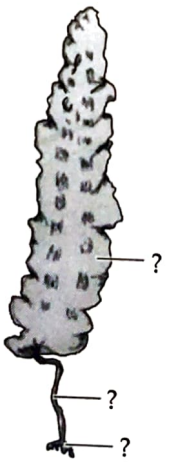
24. Cytokinesis is the cytoplasmic division of a cell at the end of mitosis or meiosis, which bring about the separation into two daughter cells. 3

(a) How cytokinesis in plants differ from that in animals ?.

(b) With reference to the cell types undergoing mitosis differentiate between animal cells and plant cells

25. (a) Name the class of algae to which *Laminaria* belongs and write it's characteristic features. 3

(b) Label the given diagram. 3



26. What is the correct way of writing a Botanical name ? Explain with example.

27. After fertilisation, ovules change into seeds and ovary mature into fruits. Fruit consists of seeds and pericarp. The thick and fleshy pericarp is three layered called epicarp, mesocarp and endocarp. 3

(a) Define simple fruits.

(b) How many types of simple fruits are found in plants?

(c) Define composite or multiple fruits.

OR 3

Frogs are a type of amphibious vertebrate, which belong to the class Amphibia of phylum Chordata. It can live on both land and in freshwater.

(a) (i) Name the three types of respiration in the frog.

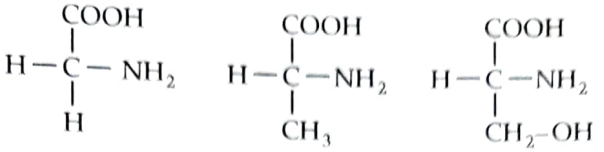
(ii) How does a frog respire during hibernation?

(b) Webs are present between the toes of frog. Why?

28. Comment on the cartwheel structure of centriole. 3

Section - D

29. AI 4



(a) Name the given structures of amino acids.

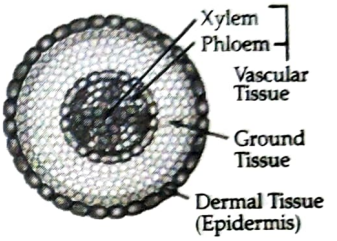
OR

What are amino acids?

(b) Answer the following questions with reference to amino acids:
  (i) Draw the structures of amino acids in solutions of different pHs.
  (ii) What is zwitter ionic form of amino acid?

(c) Classify amino acids on the basis of a number of amino group and carboxylic group. Give example for each type.

30. On the basis of structure and location, there are three types of tissue systems. These are the epidermal tissue system, the ground or fundamental tissue system and vascular or conducting tissue system. 4



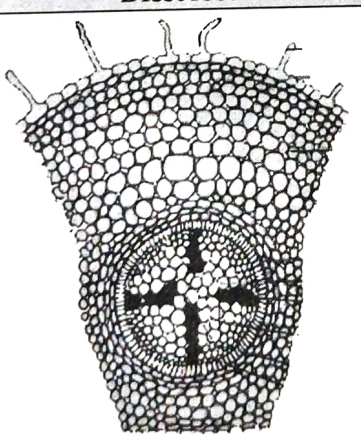
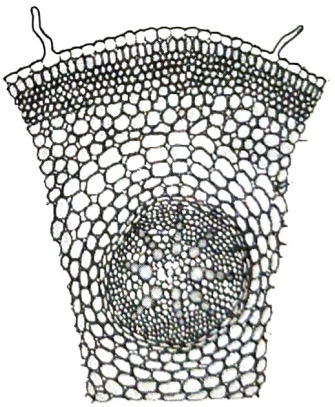
(a) What are open vascular bundles?

(b) What are conjoint vascular bundles?

(c) What does the vascular tissue system consist of?

OR

The anatomy of monocot root is similar to the dicot root in many respects. It has an epidermis, cortex, endodermis, pericycle, vascular bundles and pith. As compared to the dicot root which have fewer xylem bundles there we usually more than six (polyarch) xylem bundles in the monocot root.

Dicot root	Monocot root
	

(a) The parenchymatous cells which lie between the xylem and Phloem are?

(b) What is a stele?

(c) Differentiate monocot and dicot roots. On the basis of xylem bundles.

Section - E

31. Concerning the given table, study the different blood groups and fill in the donor-recipient compatibility. AI 5

Blood group	Antigens	Antibodies	Can give blood to	Can receive blood from (donor's group)
A	A	Anti-B		
B	B	Anti-A		
AB	A, B	Nil		
O	Nil	Anti-A, Anti-B		

OR

Study the given table and name the substances removed from the body by each part of the nephron.

S. No.	Parts of Nephron	Functions	Substances removed
(i)	Glomerulus	Glomerular ultra filtration is a passive process.	
(ii)	Proximal convoluted tubule	Selective reabsorption by active transport and reabsorption by diffusion.	
(iii)	Henle's Loop	Reabsorption	
	(A) Descending diffusion limb	Diffusion	
	(B) Ascending osmosis and limb	Osmosis and diffusion	
(iv)	Distal tubule and collecting tubules	Reabsorption (active transport)	
		Secretion by DCT	
		Active transport	
		Tubular secretion by active transport	

32. Describe briefly the regulation of kidney function by the following. AI 5

(a) ADH, **(b)** ANF, **(c)** Renin

OR

A person has severe pain and inflammation in his joints. He is diagnosed with arthritis disease. On the basis of this condition, answer the following questions:

(a) If the inflammation is diagnosed in the synovial joint and produces too much synovial fluid. What type of arthritis the patient may be suffering?

(b) What may be the possible impact on the joints of the patient?

(c) What may be the possible cause of the disease?

33. Explain the factors affecting photosysnthesis as:- AI 5

(a) External Factors. **(b)** Internal Factors.

OR

It is known that some varieties of wheat are sown in autumn but are harvested around next mid-summer.

(a) What could be the probable reason for this?

(b) Which plant hormone can replace the cold treatment?

(c) Gibberellic acid is named after which fungus?

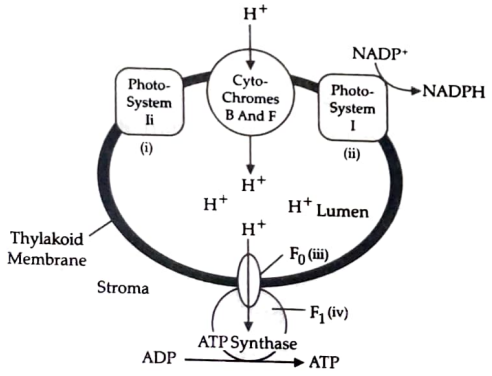
ANSWERS

Sample Question Paper-3

BIOLOGY (044)

Section - A

1. **Option (D) is correct.**
   Explanation: The incorrect statement in context to O_2 binding to Hb is "higher PO_2". The correct one is that at lower PO_2 binding to Hb is checked.
2. **Option (B) is correct.**
   Explanation: In an inflorescence where flowers are borne laterally in an acropetal succession, the position of the youngest floral bud shall be distal and this type of inflorescence is called recemose inflorescence.
3. **Option (A) is correct.**
4. **Option (C) is correct.**
   Explanation: All living organisms and non living matter made up of similar elements, plants and animals have carbon, hydrogen and oxygen more than that of non living matter, whereas the percentage composition of other inorganic molecule like calcium and gold is more in earth's crust as compare to living matter.
5. **Option (D) is correct.**
   Explanation: The genetic constitution is finally decided at anaphase-I after that each cell have half number of chromosomes.
6. **Option (A) is correct.**
   Explanation: Mycoplasma (MLOs) are the smallest cell followed by size of bacterial cell, then RBCs and the largest egg is of ostrich egg ever known
7. **Option (A) is correct.**
   Explanation: Root and shoot tip does not differentiated into epidermal tissue so epidermis is absent in these regions. They have high region of meristematic tissues.
8. **Option (A) is correct.**



9. **Option (D) is correct.**
   Explanation: Division gymnosperms are diploid and well adapted to extreme conditions. They grow seed bearing sporophylls in compact structures called cones, microsporophylls and megasporophylls are the male and female gametophyte respectively.
10. **Option (D) is correct.**
    Explanation: Henle's loops reabsorb water and sodium chloride from the filtrate, received from glomerulus.
11. **Option (D) is correct.** As viruses are connecting link between the living and non-living. So, they do not belongs to any of these.
12. **Option (A) is correct.**
    Explanation: P wave represent the electrical excitation(depolarisation) of the atrium which leads to the contraction of both the atrium.
    QRS wave represent repolarisation T wave represent repolarisation of the ventricles.
13. **Option (D) is correct.**
    Explanation: Factor like thrombin and fibrinogen are found in an inactive form. Blood without blood cells and clotting proteins is called serum.
14. **Option (D) is correct.**
    Explanation: Leaves of monocot plants shows parallel venation while leaves of dicot plants show reticulate venation.
15. **Option (D) is correct.**
    Explanation: All chordates are not vertebrates: Vertebrates have vertebral column but protochordates and agnatha have notochord that is not replaced by vertebral column.
16. **Option (C) is correct.**
    Explanation: Some bryophytes are called liverworts because their gametophytic thalli resemble liver lobes.

Section - B

17.

	Chlorophyceae	Phaeophyceae
(i)	Chiefly fresh water in nature. Unicellular species are more.	Marine forms do not exist.

(ii) Chlorophyll 'a' and 'b' is present. Fucoxanthin is absent.	Chlorophyll 'a', 'c' and Fucoxanthin is present, which is responsible for the brown colour of the algae.
(iii) Reserve food is pyrenoid which contains protein besides starch.	Reserve food is laminarin.

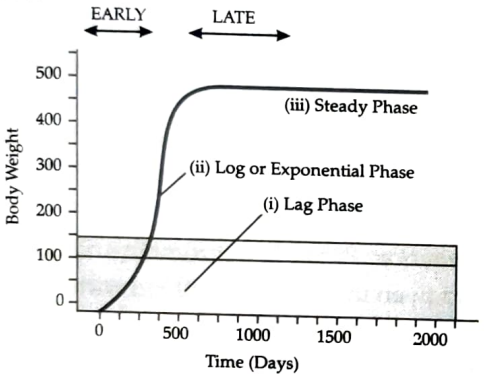
Commonly Made Error

- Students often get confused between types of algae.

Answering Tip

- There are three classes of algae. Students should thoroughly recognise and learn the characteristics of each class separately.

18. **(a)** The given diagram shows 'Sigmoid Growth Curve'.

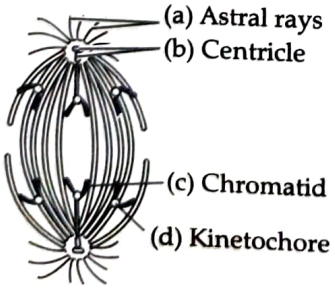


(b) **(i)** **Lag phase:** Growth is slow in the initial stage.

(ii) **Exponential period of growth:** It is second phase of maximum growth.

(iii) **Stationary phase:** When the nutrients become limiting, growth slows down.

19.



The following stage represents anaphase of mitosis.

20. **(a)** C_4 plants such as sugarcane, maize etc., possess two types of cells i.e., bundle sheath and mesophyll cell in Kranz anatomy.

(b) Oxaloacetic acid, a 4-carbon compound is the first product of C_4 cycle.

21. **Full forms of two synthetic auxins:**

NAA: Naphthalene Acetic Acid.

IBA: Indole Butyric Acid.

They are used in agriculture to induce rooting in mango, flowering in cotton plants, to break dormancy of seeds and to prevent the sprouting of potato tubers etc.

Commonly Made Error

- Students often write incorrect spelling of full form of IBA and NAA.

Answering Tip

- Carefully learn the biological abbreviations and expansions. Practice writing the spellings to eliminate errors.

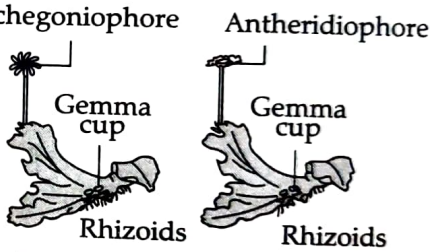
OR

(a) Reduced co-enzymes produced in the respiration are $NADH_2$ and $FADH_2$.

(b) Enzyme ATP synthase is present in inner membrane of mitochondria.

Section-C

22. **(a)**



(b) Rhizoids are slender, unicellular or multicellular hair like structures which penetrate in the moist soil and absorbs the water for the plants.

23. Conduction of nerve impulse through non-myelinated nerves:

(i) In the resting stage, the Na^+ ions are pumped out from the axoplasm. It needs the energy to work normally.

(ii) Thus, axon membrane is electronegative inside and electropositive outside, this is called resting potential. In this state, the nerve is said to be in polarised state.

(iii) When the nerve fibre is stimulated, it causes electrochemical disturbance in the nerve fibre, a change in potential. This change is called an action potential.

(iv) Thus, Na^+ migrates into the axoplasm and Cl^- ions diffuses out. Thus, negativity is increased outside and positivity is increased inside. This is called depolarisation.

(v) Depolarisation progresses along the nerve fibre in both directions from the point of stimulus

Commonly Made Error

- Students generally get confused between the migration of Na^+ in resting potential and in an action potential. Students also did not mention depolarisation in the answer clearly.

Answering Tip

- Students should clear the concept of conduction of nerve impulse through non-myelinated nerves. They must understand it in steps and with the help of a diagram.

24. **(a)** In animal cell, division of cytoplasm takes place by cleavage while in plant cell, division of cytoplasm takes place by cell-plate formation.

(b) In plants a new cell wall is fashioned between the new daughter cells, while in animal cells the cell membrane constricts to pinch the parent cell into daughter cells.

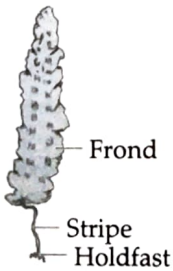
25. **(a)** *Laminaria* belongs to class phaeophyceae.

Characteristic feature of Phaeophyceae:

(i) In brown algae, fucoxanthin, chlorophyll a and c type are present.

(ii) The reserve food is laminarin starch.

(b)



26. **(i)** The biological name is written in two words.

(ii) The first name is genus and the second represents species. They are printed in italics. Example *Pisum sativum* is the scientific name of the pea plant.

(iii) Generic name begins with a capital letter (*Pisum*) and the species name begins with a small letter (*sativum*).

Commonly Made Error

- Students often write the significance of taxonomy instead of writing usefulness of biological classification.

Answering Tip

- Students should thoroughly understand and learn the guidelines for naming an organism according to nomenclature.

27. **(a)** The fruit that develops from the single simple or compound ovary of a flower is called simple fruits. The simple fruits are of two types: Dry and Succulent.

(b) **(i)** Dry fruits are of three types:
(1) Achenial (2) Capsular (3) Schizocarpic.

(ii) Succulent fruits are of three types:
(1) Berries, (2) Drupes, (3) Pomes.

(c) A composite or multiple fruits is a group of fruits which develop from the different flowers of an inflorescence. e.g., Pineapple, mulberry, fig, etc.

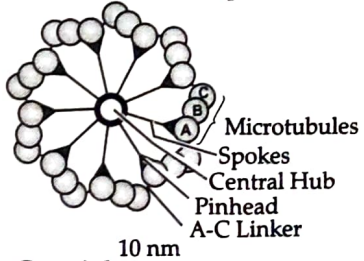
OR

(a) **(i)** All the three types of respiration found in frogs are- Cutaneous respiration, Buccal respiration, Pulmonary respiration.

(ii) The skin of the frog is moist, slimy and highly vascularised which is especially useful for respiration in hibernation and aestivation. The oxygen of the atmosphere enters the thin film of skin moisture where it goes to the blood capillaries of the skin. The oxygen mixes with the blood and passes to the different organs of the body. The carbon dioxide formed in the body organs is taken up by the blood capillaries to the skin from where it diffuses out into the air.

(b) The webs are present between the toes because these act as paddles when the frog is swimming.

28. Centrosome is a small naked organelle found in the cytoplasm of an animal cell near the outer surface of the nucleus. It consists of two bundles of microtubules called centrioles that lie at right-angles to each other. Centrioles are short cylinders with a 9+0 pattern of microtubular triplets. This means, a centriole possess a whorl of 9 peripheral fibrils. This fibrils are absent in the centre, hence the arrangement is called 9+0. Each fibrils are made of 3 sub-fibres. There is a proteinaceous hub in the central part of a centriole. The hub is connected to the triplets via radial spokes.



Centriole

Section - D

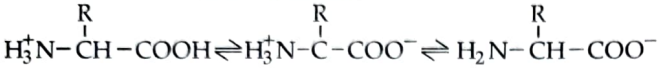
29. (a) Glycine , alanine , serine.

OR

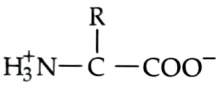
They are organic acids having both carboxylic acid group (COOH) and amino group (NH_2) generally attached to α-carbon. Carboxylic group provides an acidic property to the amino acid while amino group gives it a basic reaction. The α-carbon also bears a variable hydrocarbon or alkyl group R and hydrogen.

(b) (i) In solutions of different pHs the structure of amino acids changes as follows :

(A) Acidic Medium (B) Neutral Medium (C) Basic Medium



(ii) At specific pH when amino acid carries both positive and negative charge equally and net charge on it is zero , it is known as zwitter ionic form of amino acid.



(c) Depending upon the number of amino group and carboxylic groups, amino acids have been classified as:

1. **Neutral amino acids:** The neutral amino acids have one amino group and one carboxylic group e.g., alanine, glycine.
2. **Acidic amino acids:** The acidic amino acids have an extra carboxylic group e.g., glutamic acid, aspartic acid.
3. **Basic amino acids:** The basic amino acids have an additional amino group e.g., lysine, arginine.

30. (a) Open vascular bundles are vascular bundles in which cambium is present between phloem and xylem.

(b) In conjoint vascular bundles, the xylem and phloem are jointly situated along the same radius of vascular bundles.

(c) Vascular tissue system consists of xylem and phloem.

OR

(a) Conjunctive tissue.

(b) All tissue on the inner side of the endodermis such as pericycle, vascular bundles and pith constitute the stele.

(c) Dicot roots have fewer xylem bundles, there are more than six (polyarch) xylem bundles in the monocot root.

Section - E

31.

Blood group	Antigens	Antibodies	Can give blood to	Can receive blood from (donor's group)
A	A	Anti-B	A and AB	
B	B	Anti-A	B and AB	
AB	A,B	Nil	AB only	A, B, AB, and O
O	Nil	Anti-A, Anti-B	A, B, AB, and O	O only

OR

S.No.	Parts of Nephron	Functions	Substances removed
(i)	Glomerulus	Glomerular ultra filtration is a passive process.	
(ii)	Proximal convoluted tubule	Selective reabsorption by active transport and Reabsorption by diffusion	Reabsorption of glucose, amino acids, sodium, potassium, chlorides, water, etc.
(iii)	Henle's Loop	Reabsorption	NaCl
	(a) Descending limb	Diffusion	H_2O
	(b) Asending limb	Osmosis and Diffusion	Urea, K^+ Na^+ and Cl^-
(iv)	Distal tubule and collecting tubules	Reabsorption (active transport)	Sodium ions
		Secretion by DCT	K^+ ions
		Active Transport	K^+, H^+, Uric acid, NH_3, etc.
		Tubular secretion by active transport	Pigments and drugs.

32. Regulation of Kidney:

(a) ADH: Antidiuretic hormone (ADH) is secreted by

the hypothalamus of the brain and released into the blood from the posterior lobe of the pituitary gland. The release of ADH is triggered when an osmoreceptor in the hypothalamus detects an increase in the osmolarity of the blood above a set point of 300 osmo mL^{-1}. In this situation the osmoreceptors cells also promote thirst. It increases the reabsorption of water in the DCT and collecting duct.

(b) **ANF:** Atrial natriuretic factor is another hormone which opposes the regulation by RAAS. The walls of the artery of the heart release ANF in response to an increase in blood volume and pressure. ANF inhibits release of renin from the JG cells and thereby inhibits NaCl reabsorption by the collecting duct and reduces aldosterone release from the adrenal gland. Thus ADH, RAAS and ANF regulate the function of the kidneys. As a result, they control body fluid osmolarity, salt concentration, blood pressure and blood volume.

(c) **Renin:** The smooth muscle cells of both the afferent and efferent arterioles are swollen and contain dark granules. These cells are called juxtaglomerular cells. A fall in glomerular blood flow or glomerular blood pressure activate the JG cells to release renin. Renin converts angiotensinogen in blood into angiotensin II. The later increases blood pressure. Angiotensin also stimulates the secretion of aldosterone by the adrenal cortex, thus infusing the reabsorption of sodium ions by the DCT and that of water through collecting ducts.

OR

(a) Rheumatoid arthritis, is a condition of inflammation in synovial joints which is characterised by too much synovial fluid.

(b) Immovable joint and erosion of cartilages.

(c) Auto-immune reaction.

33. (a) **External factors :**

(i) **Light:** The quality, intensity and duration of light received by plants greatly influences the rate of photosynthesis. The quality of light influence photosynthesis as blue and red regions of the visible spectrum are the most effective. Green light has minimum effect. When sufficient intensity of light is available, they starts performing photosynthesis. Rate of photosynthesis increase proportionately with an increase in light intensity till plants achieve light saturation point. Beyond this point photosynthesis does show any change. Longer exposure to continuous light favours good photosynthesis.

(ii) **Carbon dioxide:** CO_2 concentration in atmosphere act as a limiting factor. An increase in CO_2 conc. upto 0.1% shows an increase in photosynthesis. Higher conc. Becomes toxic and inhibit the rate of photosynthesis.

(iii) **Oxygen:** High concentration of oxygen has an inhibitory effect on photosynthesis in C_3 plants, because RuBP oxygenase becomes more active resulting in photorespiration.

(iv) **Water :** Its photooxidation supplies H^+ for the reduction of NADP. The reduced NADPH is used in the reduction of CO_2 in the Calvin cycle. It also donates the electrons to P680 in non-cyclic photophosphorylation.

(e) **Temperature :** Rate of photosynthesis doubles with every 10°C rise in temperature till the optimum value is achieved. An increase in temperature above 30°C results in a fall in the rate of photosynthesis.
The optimum temperature for photosynthesis in C_3 plants is 10-25°C and in C_4 plants it is 30- 45°C.

(b) **Internal factors :**

(i) **Chlorophyll content:** Chlorophyll is essential for cyclic and non-cyclic photophosphorylation and reduction of NADP, the assimilatory power, used to fix and reduce CO_2 in Calvin cycle.

(ii) **Leaf anatomy:** The important anatomical features that influence photosynthesis include the thickness of cuticle, stomatal index, distribution of stomata, degree of opening of stomata, size and distribution of intercellular spaces, and number and distribution of vascular strands. Kranz anatomy of C_4 plants increases the efficiency of photosynthesis.

(iii) **Age of leaf :** As leaf develops, the rate of its photosynthesis increases gradually reaching maximum when the leaf becomes fully matured. Rate of photosynthesis decreases with age of the leaf.

OR

(a) Some varieties of wheat are sown in autumn but are harvested around next mid-summer. They take over one full year of growing season for the completion of their vegetative growth period and then initiate flowers and fruits. This is because, they receive low temperature without water which enables them to reach vegetative maturity. They resume growth in spring and bear flowers and grains towards mid-summer.

(b) Gibberellic acid treatment can replace the cold treatment and can induce flowering early.

(c) Gibberellic acid is named after a species of fungus - Gibberella Fujikuroi