
CBSE SAMPLE PAPER-02

CBSE Class – XI

BIOLOGY

Time allowed: 3 hours. Maximum Marks: 70

General Instructions:

- The question paper comprises of five Sections A, B, C, D and E.
 - All questions are compulsory.
 - There is no overall choice. However, internal choice has been provided in one question of 2 marks, one question of 3 marks and all the two questions of 5 marks category. Only one option in such question is to be attempted.
 - Questions 1 to 5 in section A are very short questions of one mark each.
 - Questions 6 to 9 in section B are short questions of two marks each.
 - Questions 10 to 20 in section C are questions of three marks each. Question 21 is of 4 marks.
 - Questions 22 to 23 in section D are questions of five marks each.
 - Questions 24 to 26 in section E is based on OTBA of 10 marks.
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Section – A

1. Where is parapodia seen? What is its function?

Ans. Parapodia are the paired appendages which are laterally present in the body segments of the Annelids. The main functions of Parapodia are locomotion, feeding and respiration.

2. What is an inhibitor?

Ans. An inhibitor is a molecule that binds to an enzyme and decreases its activity. This process is called inhibition and the chemical is called an inhibitor.

3. Expand PPLO.

Ans. Pleuro Pneumonia Like Organisms.

4. Define genus.

Ans. It comprises a group of related species which has more characters in common in comparison to species of other genera.

5. What is reflex action?

Ans. The entire process of response to a peripheral nervous stimulation, that occurs involuntarily i.e. without conscious effort or thought and requires the involvement of a part of the central nervous system is called a reflex action.

Section – B**6. Give two examples as to how ABA acts as a stress hormone in plants.**

Ans.a) ABA induces dormancy in seeds and helps them to withstand desiccation and other unfavourable factors.

b) It stimulates the closure of stomata under intense solar radiation and drought and increase the tolerance of plants to water scarcity and various other stresses. So it acts as a stress hormone.

7. Differentiate fascicular cambium from cork cambium.

Or

Justify that all underground parts of a plant are not always roots.

Ans.

Fascicular Cambium	Cork Cambium
It is the meristem in the stellar region, inside the vascular bundles.	It is the meristem outside the stellar region.
It produces secondary vascular tissues.	It produces secondary protective and storage tissues.
It is a primary meristem formed from procambium.	It is a secondary meristem, formed from the peripheral layers of cortex.

Or

Some plants like potato, ginger, onion and colocasia have underground stems. Underground stems show nodes and internodes. They also have terminal buds and axillary buds, so they

cannot be called as root.

8. Mention the differences between Gram positive and Gram negative bacteria.

Ans.

Gram Positive Bacteria	Gram Negative Bacteria
These bacteria retain a purple / blue colour after washing with alcohol.	These bacteria do not retain any colour after washing with alcohol.
Cell wall is thick about 20 – 80 nm in thickness.	Cell wall is thin about 8 -12 nm in thickness.
Peptidoglycan is about 70 -80 % of the cell wall.	Peptidoglycan is about 20 – 30 % of the cell wall.

9. What are aqueous humor and vitreous humor? Mention their functions?

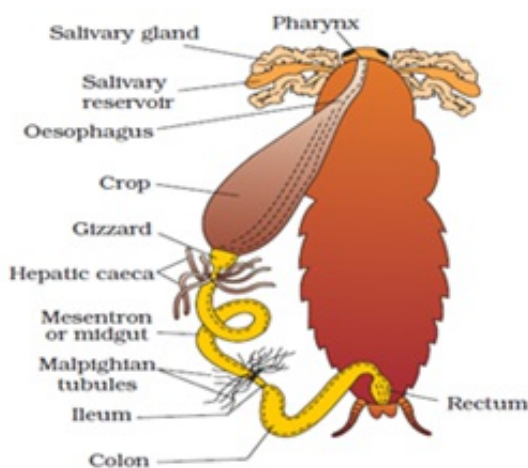
Ans. Aqueous humor is found in the anterior chamber of the eye i.e between cornea and the lens. It supports the lens and cause refraction for image formation on retina.

Vitreous humor is found in the space between the lens and the retina. It supports the lens and help in maintaining the shape and size of eye ball.

Section – C

10. Draw a labelled diagram of digestive system of a cockroach.

Ans.



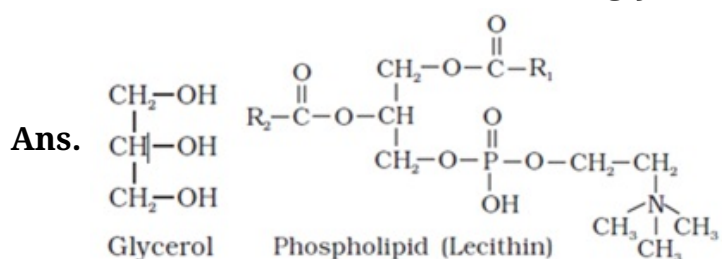
11. Describe competitive inhibition of enzyme activity with an example?

Ans. It is the phenomenon in which a substance closely resembling the substrate in its molecular structure competes with it for the active site on the enzyme. Malonate resembles succinate dehydrogenase in its structure and inhibits its action. Competitive inhibition is used in the control of bacterial pathogens.

12. What is pulmonary circulation? Describe its importance. Why is the left ventricular wall more muscular than that of the right ventricle?

Ans. Pulmonary circulation refers in the flow of deoxygenated blood from the right ventricle to the lungs and the flow of oxygenated blood from the lungs to the left atrium. Its purpose is the regular oxygenation of the blood that is brought to the right atrium from all parts of the body. The wall of the left ventricle is more muscular because it has to develop more pressure to pump blood to all parts of the body. The right ventricle has to pump blood only to the lungs and does not need to exert less pressure than left ventricle hence its wall is less muscular.

13. Give the structural formula of (i) glycerol and (ii) lecithin.



14. Explain three common symptoms of deficiency of mineral nutrients in plants, with the example of an element that causes each of them.

Ans. (a) Chlorosis

- It is the yellowing of leaves due to loss of chlorophyll.
- It is caused by the deficiency of N, S, Mg, Fe

(b) Necrosis

- It refers to the death of tissues, especially in leaves.
- It is caused by the deficiency of Ca, Mg, Cu and K.

a) Delay in flowering is caused by the deficiency of molybdenum, nitrogen and sulphur.

b) Die back of shoots i.e. death of shoot tips, caused by deficiency of copper.

c) Inhibition of cell division is caused by deficiency of potassium, calcium and nitrogen.

15. Differentiate between essential amino acids and non-essential amino acids.

Ans.

Essential Amino Acids	Non-essential Amino acids
Those amino acids which the living body cannot synthesize are called essential amino acids.	Those amino acids which the living body can synthesize are called non-essential amino acids.
Dietary protein forms the source of essential amino acids.	They need not be taken in the diet.

16. What are (i) Viroids and (ii) phycobionts?

Ans. (i) Viroids are the smallest known infectious agent that consists of a short single stranded RNA. (ii) Phycobiont refers to the algal partner in lichen.

17. Differentiate between photophosphorylation and oxidative phosphorylation.

Ans.

Oxidative Phosphorylation	Photophosphorylation
It is the process of formation of ATP where oxygen acts as the final acceptor and energy from oxidation of food is used.	It is the process of formation of ATP by phosphorylation of ADP where light energy is utilized.
This process occurs in the mitochondrial electron transport system.	This process occurs in the thylakoids membranes / electron transport in chloroplasts.
It occurs in a living cell.	It occurs in green / photosynthetic tissues.
It takes place at all times during living.	It takes place only in the light period.

18. A) Why do sharks have to swim continuously?

B) Name two phycocolloids.

OR

Mention the ploidy of the following (i) PEN of a dicot plant (ii) Leaf cells of moss (iii) Gemmae of Marchantia and (iv) Zygote of a fern.

Ans. a) Sharks do not have swim bladder and to avoid sinking, they have to swim

continuously. b) Carrageenins, Alginic acid

Or

a) Triploid b) Haploid c) Haploid d) Diploid

19. What is the significance of step-wise release of energy in respiration?

Ans. (a) A stepwise release of energy facilitates the utilization of a relatively higher proportion of that energy in the synthesis of ATP.

(b) This provides a mechanism to control the pathway and the energy output according to the need of the cell because activities of enzymes for the different steps can be enhanced or inhibited by specific compounds.

(c) The same pathway may be utilized for forming intermediates used in the synthesis of other biomolecules.

20. What is a parthenocarpic fruit? Why maize grain is not called as a seed? What is Vermicomposting.

Ans. A fruit that develops from an ovary without fertilization is called a parthenocarpic fruit. Maize grain is a single seeded fruit, where the seed coat and pericarp are completely fused. Vermiform composting refers to the process of increasing soil fertility by growing earthworm.

21. RoshanLal lives in a small town. He was feeling tired and less energetic for some times. One day he visited to doctor who advised him to undergo through blood test. Initially he hesitated for it but later agreed for it. Doctor go through the report and advised him to not use potato, rice and other sweet things.

a) What values do you find in doctor?

b) What was possible disease RoshanLal was suffering?

c) Why doctor advised him to not use potato, rice etc.

Ans. a) The doctor shows the value of his profession and advised correct way to diagnose the disease.

b) Most probably he was suffering from diabetes.

c) In diabetes, person is not able to produce enough insulin that reduce the blood sugar level. The food mentioned above contain lots of glucose that may increase the sugar level.

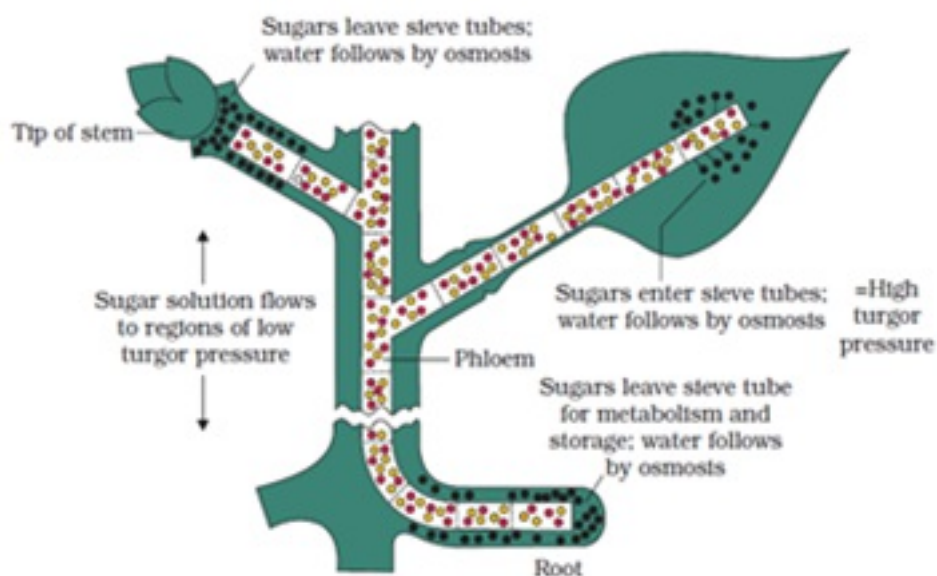
Section – D

22. Explain mass flow hypothesis with neat sketch.

Or

Explain Hatch –Slack pathway.

Ans. The accepted mechanism used for the translocation of sugars from source to sink is called the pressure flow hypothesis. As glucose is prepared at the source by photosynthesis, it is converted to sucrose, a disaccharide. The sugar is then moved in the form of sucrose into the companion cells and then into the living phloem sieve tube cells by active transport. This process of loading at the source produces a hypertonic condition in the phloem. Water in the adjacent xylem moves into the phloem by osmosis. As osmotic pressure builds up the phloem sap will move to areas of lower pressure. At the sink, osmotic pressure must be reduced. Again active transport is necessary to move the sucrose out of the phloem sap and into the cells which will use the sugar – converting it into energy, starch and cellulose. As sugars are removed, the osmotic pressure decreases and water moves out of the phloem.



Thus the movement of sugars in the phloem begins at the source, where sugars are loaded (actively transported) into a sieve tube. Loading of the phloem sets up a water potential gradient that facilitates the mass movement in the phloem. Phloem tissue is composed of sieve tube cells, which form long columns with holes in their end walls called sieve plates. Cytoplasmic strands pass through the holes in the sieve plates, so forming continuous filaments. As hydrostatic pressure in the phloem sieve tube increases, pressure flow begins, and the sap moves through the phloem. Meanwhile, at the sink, incoming sugars are actively transported out of the phloem and removed as complex carbohydrates. The loss of solute

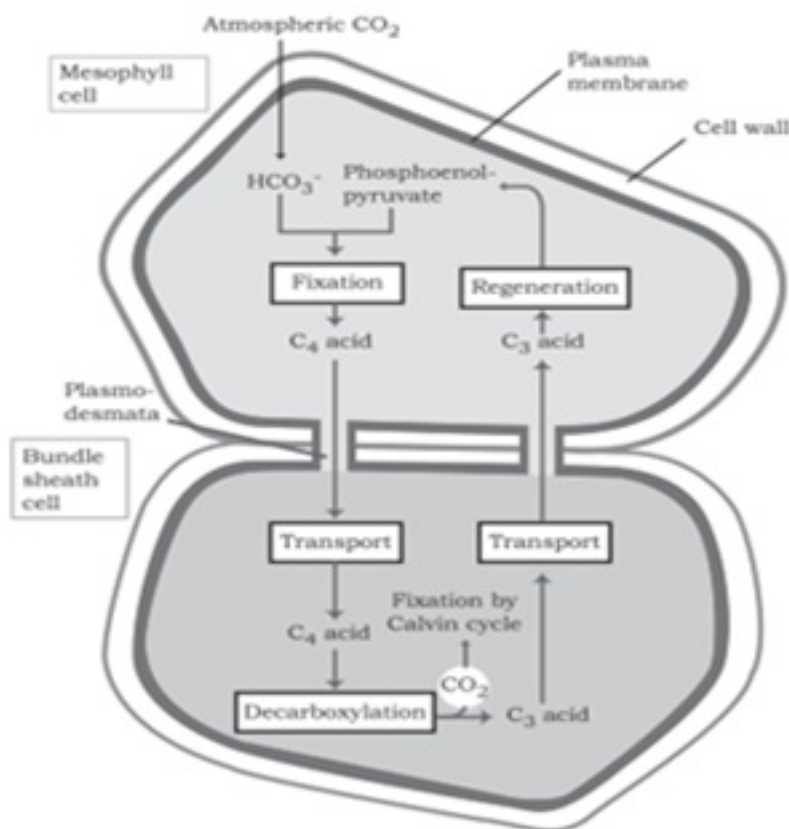
produces a high water potential in the phloem, and water passes out, returning eventually to xylem.

Or

The primary acceptor is a 3-carbon molecule phosphoenolpyruvate (PEP) and is present in the mesophyll cells. The enzyme responsible for this fixation is PEPcarboxylase or PEPcase. It is important to register that the mesophyll cells lack RuBisCO enzyme. The C_4 acid OAA is formed in the mesophyll cells.

It then forms other 4-carbon compounds like malic acid or aspartic acid in the mesophyll cells itself, which are transported to the bundle sheath cells. In the bundle sheath cells these C_4 acids are broken down to release CO_2 and a 3-carbon molecule.

The 3-carbon molecule is transported back to the mesophyll where it is converted to PEP again, thus, completing the cycle. The CO_2 released in the bundle sheath cells enters the C_3 or the Calvin pathway, a pathway common to all plants. The bundle sheath cells are rich in an enzyme Ribulose-1,5-bisphosphate carboxylase/oxygenase(RuBisCO) but lack PEPcase. Thus, the basic pathway that results in the formation of the sugars, the Calvin pathway, is common to the C_3 and C_4 plants.

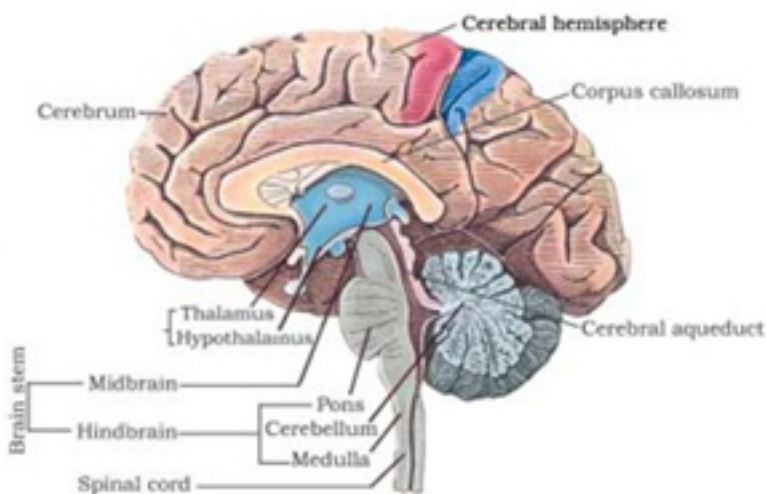


23. Explain the fore brain of human with neat sketch

Or

How the function of kidney regulated?

Ans. The forebrain consists of cerebrum, thalamus and hypothalamus. Cerebrum forms the major part of the human brain. It is divided into two halves, which are termed as the left and right cerebral hemispheres. The hemispheres are connected by a tract of nerve fibres called corpus callosum. The layer of cells which covers the cerebral hemisphere is called cerebral cortex and is thrown into prominent folds. The cerebral cortex is referred to as the grey matter due to its greyish appearance. The neuron cell bodies are concentrated here giving the colour. The cerebral cortex contains motor areas, sensory areas and large regions that are neither clearly sensory nor motor in function. These regions called as the association areas are responsible for complex functions like inter-sensory associations, memory and communication. Fibres of the tracts are covered with the myelin sheath, which constitute the inner part of cerebral hemisphere. They give an opaque white appearance to the layer and, hence it is called the white matter.



The cerebrum wraps around a structure called thalamus, which is a major coordinating centre for sensory and motor signaling. Another very important part of the brain called hypothalamus lies at the base of the thalamus. The hypothalamus contains a number of centres which control body temperature, urge for eating and drinking. It also contains several groups of neurosecretory cells, which secrete hormones called hypothalamic hormones. The inner parts of cerebral hemispheres and a group of associated deep structures like amygdala, hippocampus etc. form a complex structure called the limbic lobe or limbic system. Along with the hypothalamus, it is involved in the regulation of sexual behaviour, expression of emotional reactions (e.g. excitement, pleasure, rage and fear), and

motivation.

Or

The functioning of the kidneys is efficiently monitored and regulated by hormonal feedback mechanisms involving the hypothalamus, JGA and to a certain extent, the heart.

Osmoreceptors in the body are activated by changes in blood volume, body fluid volume and ionic concentration. An excessive loss of fluid from the body can activate these receptors which stimulate the hypothalamus to release antidiuretic hormone (ADH) or vasopressin from the neurohypophysis. ADH facilitates water reabsorption from latter parts of the tubule. An increase in body fluid volume can switch off the osmoreceptors and suppress the ADH release to complete the feedback. ADH can also affect the kidney function by its constrictor effects on blood vessels. This causes an increase in blood pressure. An increase in blood pressure can increase the glomerular blood flow and thereby the GFR.

The JGA plays a complex regulatory role. A fall in glomerular blood flow/glomerular blood pressure/GFR can activate the JG cells to release renin which converts angiotensinogen in blood to Angiotensin I and further to Angiotensin II. Angiotensin II, being a powerful vasoconstrictor, increases the glomerular blood pressure and thereby GFR. Angiotensin II also activates the adrenal cortex to release Aldosterone. Aldosterone causes reabsorption of Na^+ and water from the distal parts of the tubule. This also leads to an increase in blood pressure and GFR. This complex mechanism is generally known as the Renin-Angiotensin mechanism.

An increase in blood flow to the atria of the heart can cause the release of Atrial Natriuretic Factor (ANF). ANF can cause vasodilation and thereby decrease the blood pressure. ANF mechanism, therefore, acts as a check on the renin-angiotensin mechanism.

Section-E (OTBA) Questions

24. OTBA Question 2 mark

25. OTBA Question 3 mark

26. OTBA Question 5 mark
