CBSE SAMPLE PAPER –02 (solved)

Class-XI

BIOLOGY (THEORY)

Time: 3 Hrs **MM: 70**

General Instructions

1. The question paper comprises of five Sections A, B, C, D and E.
2. All questions are compulsory.
3. 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 five marks category. Only one option in such question is to be attempted.
4. Questions 1 to 5 in section A are very short questions of one mark each. These are to be answered in one word or one sentence each.
5. Questions 6 to 9 in section B are short questions of two marks each. These are to be answered in approximately 20-30 words each.
6. Questions 10 to 20 in section C are questions of three marks each. These are to be answered in approximately 30-50 words each. Question 21 is of 4 marks.
7. Questions 22 to 23 in section D are questions of five marks each. These are to be answered in approximately 80-120 words each.
8. Questions 24 to 26 in section E is based on OTBA of 10 marks.

Section – A

1. Expand PPLO.
2. Define genus.
3. What is reflex action?
4. Where is parapodia seen? What is its function?
5. What is an inhibitor?

Section – B

6. Mention the differences between Gram positive ad Gram negative bacteria.
7. What are aqueous humor and vitreous humor? Mention their functions?

8. Give two examples as to how ABA acts as a stress hormone in plants.

9. Differentiate fascicular cambium from cork cambium. Or

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

Section – C

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

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

12. Differentiate between photophosphorylation and oxidative phosphorylation.

13. 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.

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

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

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

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

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

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

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

21. **Roshan Lal 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 Roshan Lal was suffering?**

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

Section – D

22. Explain mass flow hypothesis with neat sketch.

Or

Explain Hatch –Slack pathway.

23. Explain the fore brain of human with neat sketch

Or

How the function of kidney regulated?

Section-E (OTBA) Questions

24.	OTBA Question	2 mark
25.	OTBA Question	3 mark
26.	OTBA Question	5 mark

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ANSWERS

Section- A

1. Pleuro Pneumonia Like Organisms.
2. It comprises a group of related species which has more characters in common in comparison to species of other genera.
3. 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.
4. Aquatic annelids like Nereis possess lateral appendages, parapodia, which help in swimming.
5. When the binding of the chemical shuts off enzyme activity, the process is called inhibition and the chemical is called an inhibitor.

Section-B

6.

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.

7. 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.

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

b) It stimulates the closure of stomain under intense solar radiation and drought and increase the tolerance of plants to water scarcity and various other stresses; so it is called as stress hormone.

9.

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.

Section-C

10.

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

11.

a) Viroids are the smallest known infectious agent that consists of a sort, single stranded RNA.

b) Phycobiont refers to the algal partner in lichen.

12.

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 ay living cell.	It occurs in green / photosynthetic tissues.
It takes place at all times during living	It takes place only in the light period.

13. a) Sharks do not have swim bladder and to avoid sinking, they have to be swimming.

b) Carageenin, Alginic acid

Or

a) Tripoid
b) Haploid
c) Haploid
d) Diploid

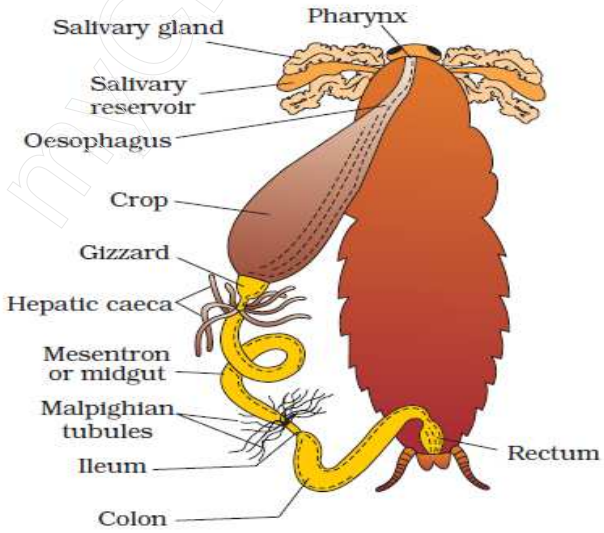
14.

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.

15.

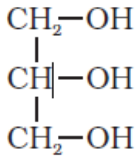


16. It is the phenomenon in which a substance closely resembling the substrate in its molecular structure competes with it for the active site on the enzyme. eg Malonate resembles succinate in its structure and inhibits the action of succinate dehydrogenase.

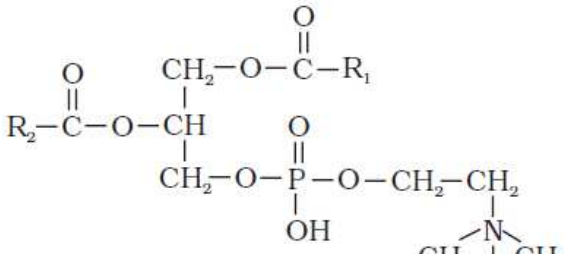
Competitive inhibition is used in the control of bacterial pathogens.

17. Pulmonary circulation refers in the flow of deoxygenated blood from the right vertical 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 need to exert less pressure than left ventricle hence its wall is less muscular.

18.



Glycerol



Phospholipid (Lecithin)

19.

a) Chlorosis

- It is the yellowing of leaves due to loss of chlorophyll.
- It is caused by the defiency 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 flowing is caused by the deficiency of molybdenum, nitrogen and sulphur.

b) Die back of shoots .ie. death of shoot tips, is caused by deficiency of copper.

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

20. 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.

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

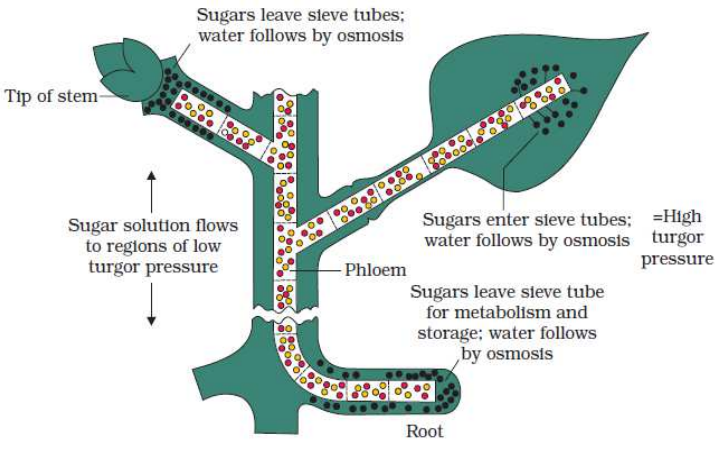
b) Most probably he was suffering from diabetes.

b) 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. 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, or 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.

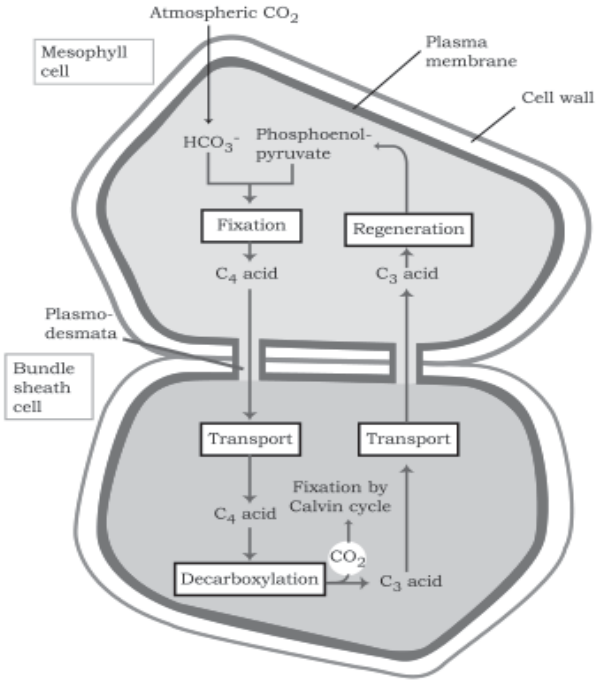


Or

The primary CO2 acceptor is a 3-carbon molecule phosphoenol pyruvate **(**PEP**)** and is present in the mesophyll cells. The enzyme responsible for this fixation is PEP carboxylase or PEPcase. It is important to register that the mesophyll cells lack RuBisCO enzyme. The C4 acid OAA is formed in the mesophyll cells.

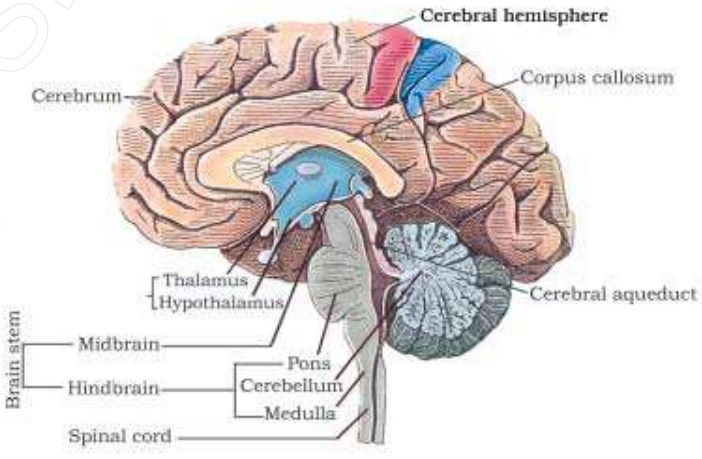
It then forms other 4-carbon compounds like malic acid or aspartic acid in the mesophyll cells itself, which are transported to the bundle sheath cells. In the bundle sheath cells these C4 acids are broken down to release CO2 and a 3-carbon molecule.

The 3-carbon molecule is transported back to the mesophyll where it is converted to PEP again, thus, completing the cycle. The CO2 released in the bundle sheath cells enters the C3 or the Calvin pathway, a pathway common to all plants. The bundle sheath cells are rich in an enzyme Ribulose 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 C3 and C4 plants.



23. The forebrain consists of cerebrum, thalamus and hypothalamus. Cerebrum forms the major part of the human brain. A deep cleft divides the cerebrum longitudinally 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, thereby preventing diuresis. 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 (dilation of blood vessels) and thereby decrease the blood pressure. ANF mechanism, therefore, acts as a check on the renin-angiotensin mechanism.