CBSE SAMPLE PAPER – 09 (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. Questions1 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 to26 in section E is based on OTBA of 10 marks.

Section – A

1. What is meant by 'in vitro'?
2. Name two accessory digestive organs in humans.
3. What type of modification of root is found in a) Banyan tree b) Mangrove trees?
4. What is fibroin?
5. The term to describe vascular bundles in which phloem lies at the centre surrounded by xylem.

Section – B

6. What are the structures of Golgi complex?

7. Differentiate dicot stem and monocot stem.

8. Differentiate primary phloem from secondary phloem.

What is meant by apoplast pathway? Why does it occur in cortex and not in endosperm?

Or

Differentiate fibrous joints and cartilaginous joints.

Section – C

9. What is phyllotaxy? Give one difference between racemose and cymose inflorescence.

10. Relate the following with the phylum: radial symmetry, haemocoel, water vascular system, setae, pneumatic bones and radula.

11. Draw a labelled diagram of fluid mosaic model of plasma membrane.

Or

Draw the floral diagram of fabaceae.

12. Explain with examples the three categories of plants based on photoperiodism.

13. Explain mechanism of transpiration in plants?

14. Give the structural formula of a) Glycine, b) Alanine and c) Serine.

15. Draw the labelled diagram of circulatory system of cockroach.

16. Draw a diagram of mitochondrion.

17. Draw the different types of aestivation.

18. Give all the six classes of enzymes.

19. Give the names of 4 classes of kingdom fungi.

20. Give 4 differences between cyclic and non-cyclic photophosphorylation

21. **Joy loves to play football and was selected as captain of the school team for the district level tournament. He also does social work. He attended a blood donation camp to donate blood and came to know that he was HIV positive. He lost interest in games and refused to play or study. He started counting his days. He remained absent from school for a long time. The Biology teacher visited his house and counselled him. Joy was back at school and also played the tournament.**

a) What sense of responsibility did the Biology teacher exhibit?
b) A person detected to be HIV positive should be isolated in the society? Do you agree? Why/ Why not?
c) How is AIDS spread?

Section – D

22. Explain both pathways of water and ion absorption and movement in roots with neat sketch.

Or

Describe briefly the deficiency symptoms seen in plants.

23. Explain androecium and gynoecium in flowering plants.

Or

Briefly explain the cardiac cycle.

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. It means in an artificial environment such as test tube.
2. Salivary glands, liver and gall bladder. (Any two).
3. a) Banyan tree – Prop trees, b) Mangrove trees – Pneumatophores.
4. The protein component of silk fibre derived from silkworms and spiders which form threads to create webs and cocoons.
5. Amphivasal.

Section-B

6. Structure of Golgi complex are:-

They consist of many flat, disc-shaped sacs or cisternae of 0.5□m to 1.0□m diameter (Figure 8.6). These are stacked parallel to each other. Varied number of cisternae is present in a Golgi complex. The Golgi cisternae are concentrically arranged near the nucleus with distinct convex *cis* or the forming face and concave *trans* or the maturing face.

7.

Dicot stem	Monocot stem
It is differentiated into epidermis, cortex, endodermis, pericycle, stellar system and pith.	It is not differentiated into cortex, endodermis etc.

Hypodermis is Collenchymatous.	Hypodermis is sclerenchymatous.
Vascular bundles are arranged in a ring.	Vascular bundles are scattered.
Medullary rays are found.	Medullary rays are absent.
No bundle sheath around vascular bundles	There is sclerenchymatous bundle sheath.
Secondary growth takes place due to the presence of cambium.	Secondary growth does not takes place due to absence of cambium.
Vascular bundles are limited in number.	Vascular bundles are numerous.

8. The first formed primary phloem consists of narrow sieve tubes and is called protophloem and the later formed phloem has bigger sieve tubes and is called metaphloem.

9. The movement of water occurs exclusively through the cell wall and intercellular spaces. It does not cross any membrane or living component of the cell. It occurs in cortex as the cortical cells are loosely arranged and offer no resistance. Since endodermis has casparian strips made of suberin, it does not allow movement to pass through and so the water is forced to follow symplast pathway.

Or

Fibrous joints do not allow any movement. This type of joint is shown by the flat skull bones which fuse end-to-end with the help of dense fibrous connective tissues in the form of sutures, to form the cranium. In cartilaginous joints, the bones involved are joined together with the help of cartilages. The joint between the adjacent vertebrae in the vertebral column is of this pattern and it permits limited movements.

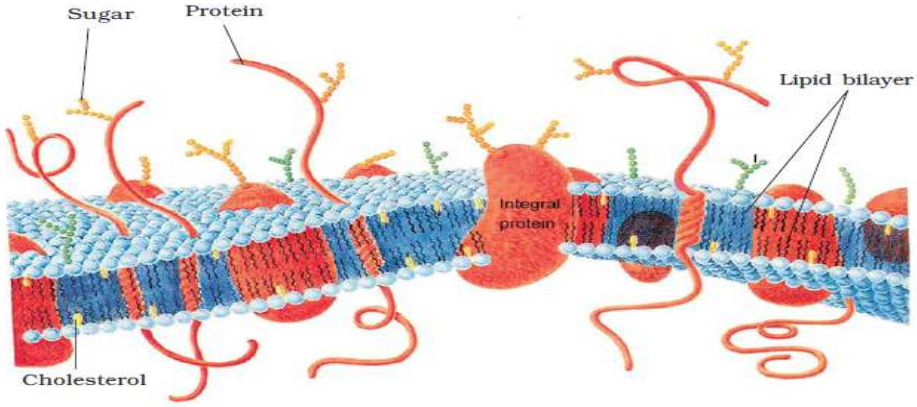
Section-C

10. Phyllotaxy refers to the mode of arrangement of leaves on stem or branch.

Racemose inflorescence	Cymose inflorescence
Flower opening is centripetal.	Flower opening is centrifugal.
The terminal bud continues to grow.	The terminal bud forms a flower.
Flowers are arranged in an acropetal order.	Flowers are arranged in a basipetal order.

11. Radial symmetry: Echinodermata, Haemocoel : Arthropoda, water vascular system : Echinodermata, Setae : Annelida, Pneumatic bones : Chordata and Radula : Mollusca.

12.



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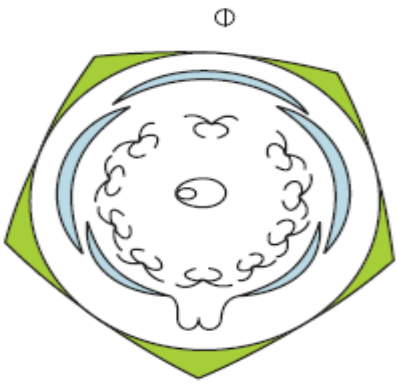


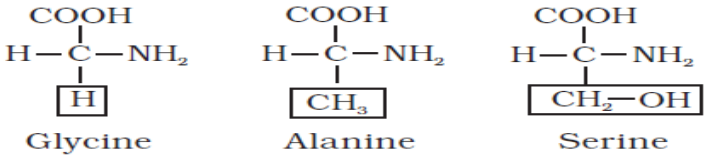
13. Plants are grouped into the following three categories:

a) Short-day plants – These plants which need a light shorter than their critical photoperiods for flowering. Egs – Chrysanthemum, Cosmos.

b) Long-day plants – These plants which need light period longer than their critical photoperiods for flowering. Egs – Wheat, barley.

c) Intermediate-day plants – These plants are not influenced by length of light period for flowering. Egs – Tomato, cucumber.

14.



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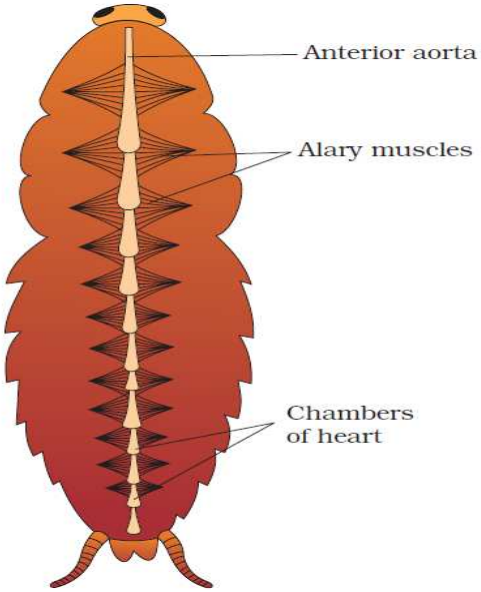

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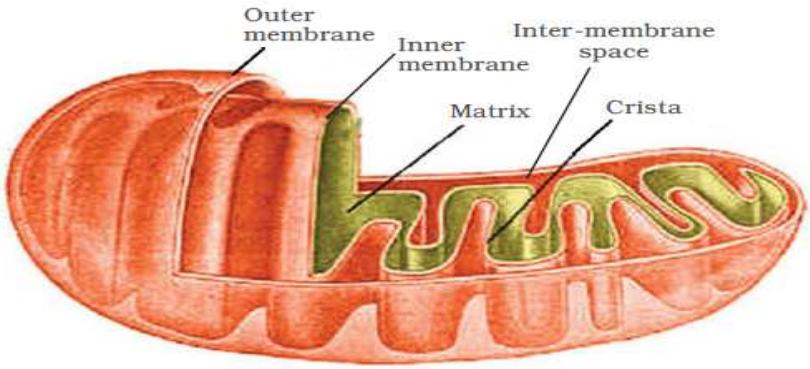
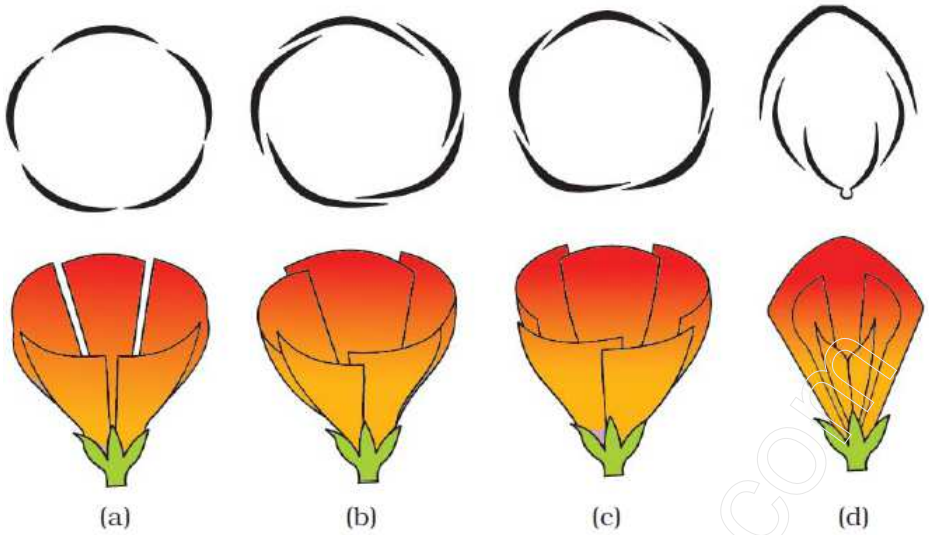


17.



Valvate Twisted Imbricate Vexillary

18. Class I – Oxidoreductases, Class II – Transferases, Class III – Hydrolases, Class IV – Lyases, Class V – Isomerases and Class VI – Ligases.

19. The four classes of kingdom fungi are: Phycomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes.

20.

Cyclic photophosphorylation	Non-cyclic photophosphorylation
The electrons emitted by PSI come back to same PSI chlorophyll.	The electrons emitted by PSII do not come back to same PSII.
It involves PSI.	It involves PSII.
It forms 2 ATP molecules.	It forms one ATP molecules.
No photolysis or NADPH occurs.	There is photolysis of water and production of NADPH.
Oxygen is not liberated.	Oxygen is liberated.

21.

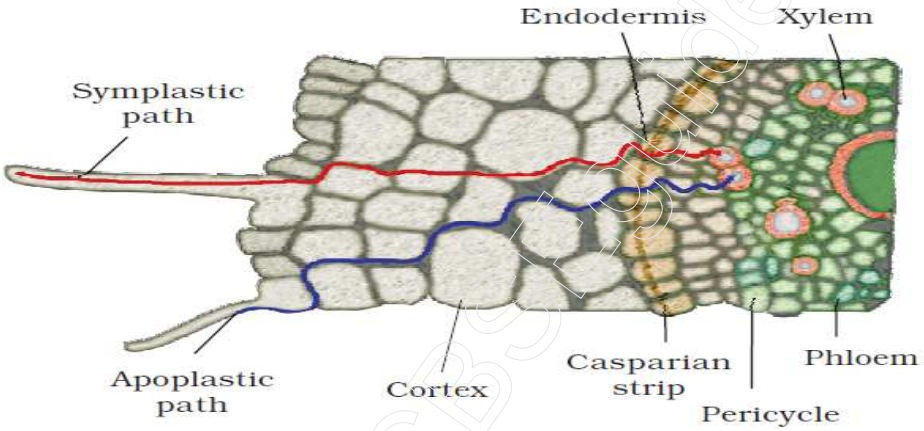
a. The Biology teacher shows his resposibilty properly by giving right suggestion.

b) No, the HIV positive person should not be isolated from society. He must given social and moral support.

c) AIDS spread through sex with multiple partners, from mother to foetus and contaminated blood.

Section-D

22. Most of the water flow in the roots occurs via the apoplast since the cortical cells are loosely packed, and hence offer no resistance to water movement. However, the inner boundary of the cortex, the endodermis, is impervious to water because of a band of suberised matrix called the casparian strip. Water molecules are unable to penetrate the layer, so they are directed to wall regions that are not suberised, into the cells proper through the membranes. The water then moves through the symplast and again crosses a membrane to reach the cells of the xylem. The movement of water through the root layers is ultimately symplastic in the endodermis. This is the only way water and other solutes can enter the vascular cylinder.



Once inside the xylem, water is again free to move between cells as well as through them. In young roots, water enters directly into the xylem vessels and/or tracheids. These are non-living conduits and so are parts of the apoplast.

Or

Whenever the supply of an essential element becomes limited, plant growth is retarded. The concentration of the essential element below which plant growth is retarded is termed as deficiency. The element is said to be deficient when present below the critical

concentration. Since each element has one or more specific structural or functional role in plants, in the absence of any particular element, plants show certain morphological changes.

These morphological changes are indicative of certain element deficiencies and are called deficiency symptoms. The deficiency symptoms vary from element to element and they disappear when the deficient mineral nutrient is provided to the plant. However, if deprivation continues, it may eventually lead to the death of the plant. The parts of the plants that show the deficiency symptoms also depend on the mobility of the element in the plant. For elements that are actively mobilized within the plants and exported to young developing tissues, the deficiency symptoms tend to appear first in the older tissues. For example, the deficiency symptoms of nitrogen, potassium and magnesium are visible first in the senescent leaves. In the older leaves, biomolecules containing these elements are broken down, making these elements available for mobilising to younger leaves. The deficiency symptoms tend to appear first in the young tissues whenever the elements are relatively immobile and are not transported out of the mature organs, for example, elements like sulphur and calcium are a part of the structural component of the cell and hence are not easily released.

The kind of deficiency symptoms shown in plants includes chlorosis, necrosis, and stunted plant growth, premature fall of leaves and buds, and inhibition of cell division. Chlorosis is the loss of chlorophyll leading to yellowing in leaves. This symptom is caused by the deficiency of elements N, K, Mg, S, Fe, Mn, Zn and Mo. Likewise, necrosis, or death of tissue, particularly leaf tissue, is due to the deficiency of Ca, Mg, Cu, K. Lack or low level of N, K, S, Mo causes an inhibition of cell division. Some elements like N, S, Mo delay flowering if their concentration in plants is low.

23. Androecium is composed of stamens. Each stamen which represents the male reproductive organ consists of a stalk or a filament and an anther. Each anther is usually bilobed and each lobe has two chambers, the pollen-sacs. The pollen grains are produced in pollen-sacs. A sterile stamen is called staminode. Stamens of flower may be united with other members such as petals or among themselves. When stamens are attached to the petals, they are epipetalous as in brinjal, or epiphyllous when attached to the perianth as in the flowers of lily. The stamens in a flower may either remain free

(polyandrous) or may be united in varying degrees. The stamens may be united into one bunch or one bundle (monoadelphous) as in china rose, or two bundles (diadelphous) as in pea, or into more than two bundles (polyadelphous) as in citrus. There may be a variation in the length of filaments within a flower, as in Salvia and mustard.

Gynoecium is the female reproductive part of the flower and is made up of one or more carpels. A carpel consists of three parts namely stigma, style and ovary. Ovary is the enlarged basal part, on which lies the elongated tube, the style. The style connects the ovary to the stigma. The stigma is usually at the tip of the style and is the receptive surface for pollen grains. Each ovary bears one or more ovules attached to a flattened, cushion-like placenta. When more than one carpel is present, they may be free (as in lotus and rose) and are called apocarpous. They are termed syncarpous when carpels are fused, as in mustard and tomato. After fertilisation, the ovules develop into seeds and the ovary matures into a fruit.

Or

All the four chambers of heart are in a relaxed state, i.e., they are in joint diastole. As the tricuspid and bicuspid valves are open, blood from the pulmonary veins and vena cava flows into the left and the right ventricle respectively through the left and right atria. The semilunar valves are closed at this stage. The SAN now generates an action potential which stimulates both the atria to undergo a simultaneous contraction – the atrial systole. This increases the flow of blood into the ventricles by about 30 per cent. The action potential is conducted to the ventricular side by the AVN and AV bundle from where the bundle of HIS transmits it through the entire ventricular musculature. This causes the ventricular muscles to contract, (ventricular systole), the atria undergoes relaxation (diastole), coinciding with the ventricular systole.

Ventricular systole increases the ventricularpressure causing the closure of tricuspid and bicuspid valves due to attempted backflow of blood into the atria. As the ventricular pressure increases further, the semilunar valves guarding the pulmonary artery (right side) and the aorta (left side) are forced open, allowing the blood in the ventricles to flow through these vessels into the circulatory pathways. The ventricles now relax (ventricular diastole) and the ventricular pressure falls causing the closure of semilunar valves which prevents the backflow of blood into the ventricles. As the ventricular

pressure declines further, the tricuspid and bicuspid valves are pushed open by the pressure in the atria exerted by the blood which was being emptied into them by the veins. The blood now once again moves freely to the ventricles.

The ventricles and atria are now again in a relaxed (joint diastole) state, as earlier. Soon the SAN generates a new action potential and the events described above are repeated in that sequence and the process continues. This sequential event in the heart which is cyclically repeated is called the cardiac cycle and it consists of systole and diastole of both the atria and ventricles. As mentioned earlier, the heart beats 72 times per minute, i.e., that many cardiac cycles are performed per minute. From this it could be deduced that the duration of a cardiac cycle is 0.8 seconds. During a cardiac cycle, each ventricle pumps out approximately 70 mL of blood which is called the stroke volume. The stroke volume multiplied by the heart rate (no. of beats per min.) gives the cardiac output. Therefore, the cardiac output can be defined as the volume of blood pumped out by each ventricle per minute and averages 5000 mL or 5 litres in a healthy individual.

The body has the ability to alter the stroke volume as well as the heart rate and thereby the cardiac output. For example, the cardiac output of an athlete will be much higher than that of an ordinary man. During each cardiac cycle two prominent sounds are produced which can be easily heard through a stethoscope. The first heart sound (lub) is associated with the closure of the tricuspid and bicuspid valves whereas the second heart sound (dub) is associated with the closure of the semilunar valves. These sounds are of clinical diagnostic significance.