CBSE SAMPLE PAPER –03 (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. Define cell cycle.
2. What are micro and macro nutrients? Give examples.
3. Define the term 'vernalization'.
4. What are the functions of major proteins?
5. Give two similarities of kingdom monera and protista.

Section – B

6. Cell is the basic unit of the life. Discuss.
7. How does water scarcity affect the rate of photosynthesis?

8. How is the gut lining protected from its own secretion of proteases?

9. What are the different ways in which specimens are kept in a museum?

Or

Differentiate between ascus and basidia, apart from the names of the groups producing them.

Section – C

10. Write any four differences between collenchyma and sclerenchyma.

11. Draw a labelled diagram of Nostoc.

12. Define RQ. Show its value for fats and carbohydrates.

13. Describe the nervous system of an earthworm.

Or

Draw a labelled diagram of the female reproductive system of frog.

14. What was Van Niel's experiment? What was the finding from it? Give the equation of photosynthesis given by him.

15. Write six distinguishing features of class Mammalia.

16. Describe the quaternary structure of proteins.

17. Describe the auto-regulation of GFR.

18. Draw the diagram of six different shapes of the cells.

19. Enumerate the chemical events that occur in the process of clotting of blood.

20. What are kinetochores? What are their functions?

21. **Ram Prakash is small farmer in a remote village. His daughter name is Santi. Ram Prakash fixed the marriage of his daughter at the age of 15 but Santi wants to study further. She discussed the matter with her teacher who lived in same village. Next day the teacher meets Santi's father and convinced him about the importance of study and disadvantage of early marriage. Finally Ram Prakash agreed to continue her study.**

a. What values do you find in teacher?

b. Why girl education is more important than boys education?

c. What is the disadvantage of early marriage of girl?

Section – D

22. Write a note on imbibitions? Explain the mechanism of it in brief.

Or

a) Schematically represent the water movement in the leaf.

b) Draw a labelled diagram showing apoplast and symplast pathway.

23. Write a note on dicotyledonous seed. With well labelled diagram

Or

Draw the structure of human brain and label it accurately?

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. The sequence of events by which a cell duplicates its genome, synthesizes the other constituents of the cell and eventually divides into two daughter cells is termed cell cycle.

2. Macronutrients are generally present in plant tissues in large amounts. For example- C, H, N, P, S, K etc.

   Micronutrients or trace elements are needed in very small amounts. These include Fe, Mg, Cu, Mb, Zn etc.

3. There are plants for which flowering is either quantitatively or qualitatively dependent on exposure to low temperature. This phenomenon is termed vernalisation.

4. Fibrinogen, globulins and albumins are the major proteins. Fibrinogens are needed for clotting or coagulation of blood. Globulins primarily are involved in defense mechanisms of the body and the albumins help in osmotic balance.

5.
   a. Both the kingdom contains unicellular organisms.
   b. Both of them includes aquatic organism.

Section-B

6. All organisms are made of cell(s) and its/ their products, so cell is the structural unit of life. The sum total of the coordinated activities cell organelles and each of the different

types of cells is responsible for the metabolism / life of an organism; so cell is the basic unit of living organism.

7. When water is the limiting factor, photosynthesis is affected as – the stomata close and entry carbon dioxide is restricted and the cells lose their turgidity and so leaves are not fully exposed to light.

8. Proteases are secreted in inactive form and pose no threat to the gut lining. The mucus provides protection to the epithelial lining.

9.

a) The specimens are kept in suitable chemical solutions.

b) Plant and animal specimens are also preserved as dry specimens.

c) Insects are normally dried and pinned in the insect boxes.

d) Larger animals (birds, mammals) are preserved as stuffed specimens.

Or

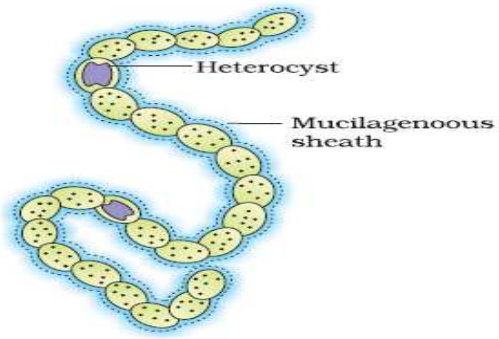
Ascus	Basidia
Spores are produced endogenously	Spores are produced exogenously
Eight spores are inside an ascus	Four spores are produced by a basidium

Section-C

10.

Collenchyma	Sclerenchyma
The cells are alive at maturity	The cells are dead at maturity
Cell wall is unevenly thickened, thickening are prominent in the corners.	Cell wall is unevenly thickened; sometimes lumen in obliterated.
It gives strength and flexibility to growing organs	It gives mechanical support to the organ and the fibres are used for making opes / threads.
It may posses chloroplates and photosynthesis	It never possesses chloroplasts.

11. Nostoc



12. Respiratory quotient is defined as the ratio of the volume of carbon dioxide evolved to the volume of oxygen consumed in respiration. RQ varies with the respiratory substrates, as shown below:

(i) When a carbohydrate is the respiratory substrate the RQ is one

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{Energy}$$

$$RQ = \frac{6CO_2}{6O_2} = 1.0$$

(ii) When fats are the respiratory substrate the RQ is less than one.

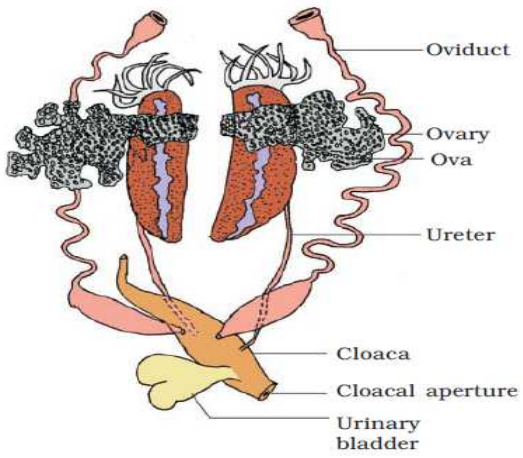
$$2(C_{51}H_{98}O_6) + 145O_2 \longrightarrow 102CO_2 + 98H_2O + \text{energy}$$

Tripalmitin

$$RQ = \frac{102CO_2}{145O_2} = 0.7$$

13. A brain is formed by the fusion of a pair of suprapharyngeal / cerebal ganglia; it lies in the anterior and dorsal part of the third segment. It is connected to two sub-pharyngeal ganglia' lying below the pharynx, with the help of a pair of ircumpharyngeal connectives, which form a nerve ring. A double ventral nerve cord runs up to the last segment. Ganglia are segmentally arranged on the nerve cord and they give of nerves tot eh organs of that segment.

Or



14. He employed purple and green photosynthetic bacteria. He demonstrated that photosynthesis is essentially a light-dependent reaction in which hydrogen from a suitable oxidisable compound reduces carbon dioxide to carbohydrates.

This can expressed as $2\ H_2A + CO_2 \rightarrow 2\ A + CH_2O + H_2O$.

Green plants, water is the hydrogen donor as it is oxidised to oxygen. Photosynthetic bacteria used hydrogen sulphide (H_2S) as hydrogen donor and so the oxidation product is sulphur or sulphate depending on the organism.

15.

(a) Presence of mammary glands is a characteristic feature; they are functional in females and vestigial in males.

(b) External ear is present.

(c) Trunk is internally partitioned by a muscular diaphragm into thoracic and abdominal cavities.

(d) Skin possesses sweat glands and sebaceous glands; skin has hair a unique feature of the class.

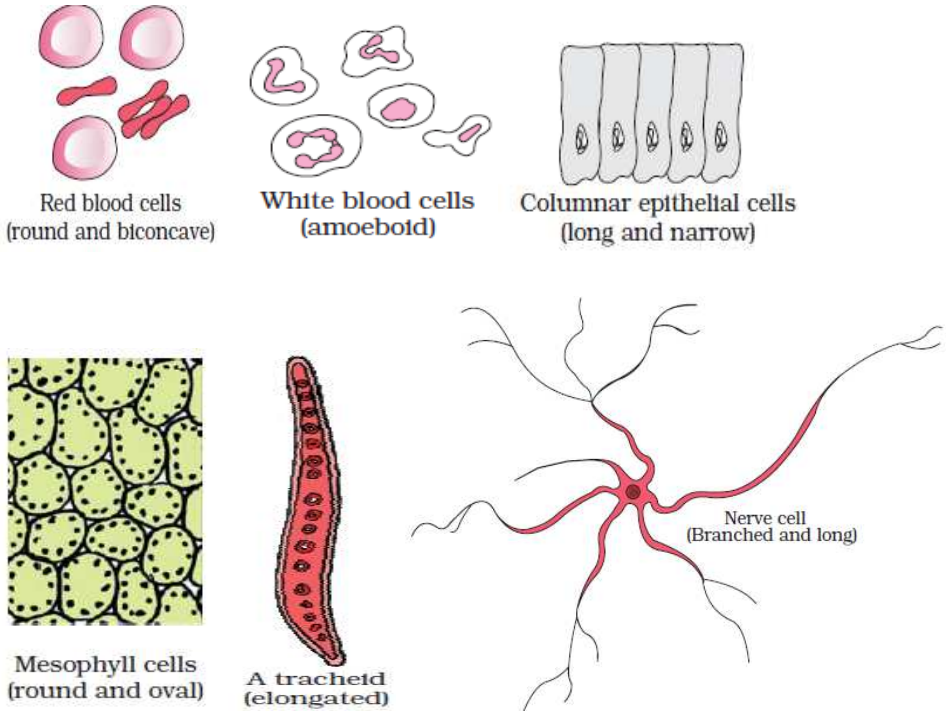
(e) Heart is four – chambered with two auricles and two ventricles, there is double circulation.

(f) Animals are viviparous and give birth to young ones. The foetus is nourished by the mother through the placenta.

16. When a protein has many subunits (polypeptide) each having a primary , secondary or tertiary structure of its own, the protein is said to be in its quaternary structure. E.g Haemoglobin, Insulin, Myoglobin.

17. Juxta glomercular apparatus (JGA) is a specialized cellular structure located where the distal convoluted tubule passes close to the Bowman's capsule near the afferent article, where the two come in contact with each other. A fall in the GFR activities the cells of TGA to release rennin. Rennin acts through a complex series of reactions called rein-angiotension-aldosterone mechanism. This increases the blood volume and blood pressure and the GFR is brought back to normal.

18.



19. When blood comes out of a blood vessel, the platelets clump together, break and release platelet factors, thromboplastin. The prothrombin initiates the conversion of prothombin in to thrombin. Thrombin catalyses the conversion of fibrinogen into fibrin which forms a mesh / network in which blood cells get enlarged.

Ca^{++} ions are necessary for both the above reactions.

20. Kinetochores are small disc-shaped structures at the surface of centromere. They serve as the sites of attachment of the spindle fibres to the centromere of chromosomes. The centromere play important role in cell division.

21. a) The teacher was caring and responsible to her duty to society.

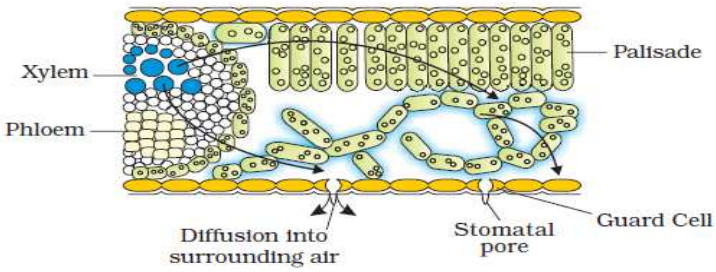
b) An educated girl child can educate the family more than a boy can do so. Early education is generally carried by mother of the children.

c) Early marriage to girl leads to lots of health related and economical problems. The body of girl is not able to bears the reproduction related problem and fell to disease.

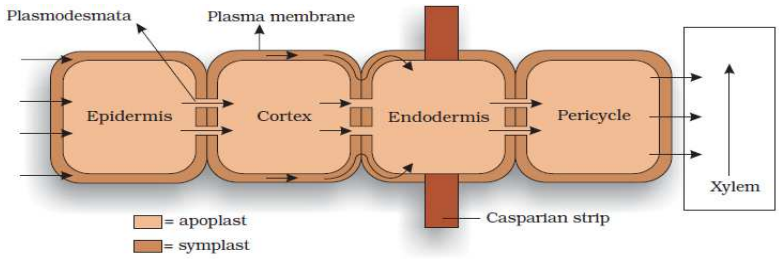
Section-D

22. Imbibition is a special type of diffusion when water is absorbed by solids – colloids – causing them to enormously increase in volume. The classical examples of imbibition are absorption of water by seeds and dry wood. The pressure that is produced by the swelling of wood had been used by prehistoric man to split rocks and boulders. If it were not for the pressure due to imbibition, seedlings would not have been able to emerge out of the soil into the open. Imbibition is also diffusion since water movement is along a concentration gradient; the seeds and other such materials have almost no water hence they absorb water easily. Water potential gradient between the absorbent and the liquid imbibed is essential for imbibition. In addition, for any substance to imbibe any liquid, affinity between the adsorbant and the liquid is also a pre-requisite.

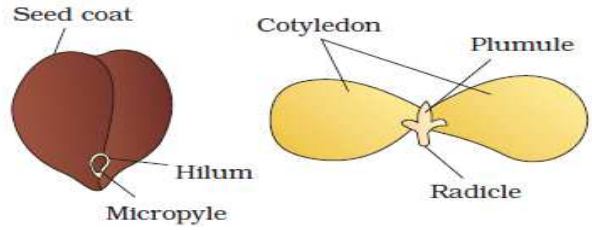
a) Or



b)



23. The outermost covering of a seed is the seed coat. The seed coat has two layers, the outer testa and the inner tegmen. The hilum is a scar on the seed coat through which the developing seeds were attached to the fruit. Above the hilum is a small pore called the micropyle. Within the seed coat is the embryo, consisting of an embryonal axis and two cotyledons. The cotyledons are often fleshy and full of reserve food materials. At the two ends of the embryonal axis are present the radicle and the plumule. In some seeds such as castor the endosperm formed as a result of double fertilisation, is a food storing tissue. In plants such as bean, gram and pea, the endosperm is not present in mature seeds and such seeds are called non-endospermous.



Or