CBSE SAMPLE PAPER-01

CBSE Class – XI

BIOLOGY

Time allowed: 3 hours, Maximum Marks: 70

General Instructions

a. The question paper comprises of five Sections A, B, C, D and E.
b. All questions are compulsory.
c. 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.
d. 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.
e. 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.
f. 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 four marks.
g. Questions 22 to 23 in section D are questions of five marks each. These are to be answered in approximately 80-120 words each.
h. Questions 24 to26 in section E is based on OTBA of 10 marks.

Section – A

1. Differentiate open and closed circulatory system with an example for each.

Ans. Open circulatory system is present in arthropods and molluscs in which blood pumped by the heart passes through large vessels into open spaces or body cavities called sinuses. Annelids and chordates have a closed circulatory system in which the blood pumped by the heart is always circulated through a closed network of blood vessels.

2. What is meant by nodes of Ranvier?

Ans. The gaps between two adjacent myelin sheaths are called nodes of Ranvier.

3. What are intercalary meristems? Where do they occur?

Ans. The meristem which occurs between mature tissues is known as intercalary meristem. They occur in grasses and regenerate parts removed by the grazing herbivores.

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4. What are flagellated protozoans? Give an example.

Ans. Flagellated protozoans: The members of this group are either free-living or parasitic. They have flagella. The parasitic forms cause diseases such as sleeping sickness. Example: Trypanosoma.

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5. Define ammonification.

Ans. Decomposition of organic nitrogen into ammonia is called ammonification.

Section – B

6. Write the significance of mitosis.

Ans. It helps in cell division, which enables an organism to grow and reproduce. During mitosis, a single cell divides and produces two identical daughter cells. Each cell contains the same genetic material and chromosome number as the original cell.

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7. What is binomial nomenclature? Explain with an example.

Or

How are archaebacteria able to tolerate extremes of climate?

Ans. It is a method of naming the organisms, in which every organism is given a scientific name, which has two parts - the first is the name of the genus and the second part is the name of the species. In this, Mangifera is the name of the genus while indica is the name of the species belonging to the genus Mangifera.

Or

Archaebacteria are able to live in extreme conditions because of the branched chain lipids in their cell wall which help them to tolerate high saline conditions, high acidic or alkaline pH and extremes of temperature.

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8. Define plasticity. Give an example of this phenomenon.

Ans. Plasticity refers to the ability of plants to follow different pathways in response to

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environment or phase of life to form different kinds of structures.
- Heterophylly in certain plants is an example of plasticity.
- In such plants, the leaves of juvenile plants are different in shape from those of adult plants e.g cotton, larkspur, eucalyptus etc.

9. Where is thymus located in human body? Name the hormone and mention its important function.

Ans. Thymus gland is located in front of the trachea in the thoracic cavity. It secretes hormone thymosin, which has a stimulating effect on the immune system. It promotes proliferation and maturation of T-lymphocytes.

Section – C

10. Differentiate between aerobic respiration and fermentation.

Ans.

Aerobic Respiration	Fermentation
It is a process in which glucose is completely broken down into carbon dioxide and water.	It is a process in which glucose is only partially oxidised to some organic compound
There is a net gain of thirty eight molecules of ATP for every molecule of glucose.	There is a net gain of only two molecules of ATP per molecule of glucose.
NADH is oxidised on the electron transport chain and the reaction is very vigorous.	NADH is slowly oxidised to NAD^+

11. What are the events that take place in telophase of mitosis?

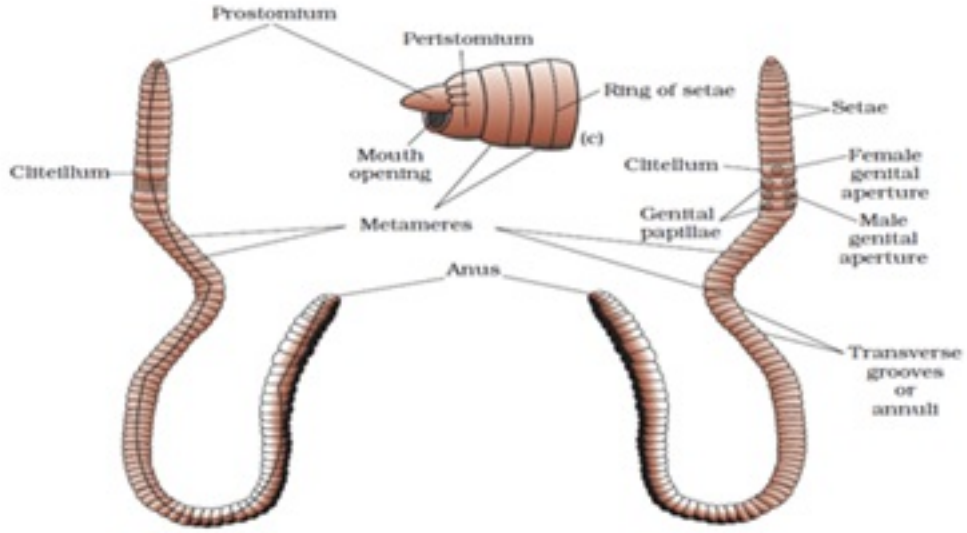
Ans. Chromosomes cluster at opposite spindle poles and their identity is lost as discrete elements.
Nuclear envelope assembles around the chromosome clusters.
Nucleolus, Golgi complex and ER reform.

12. Draw the dorsal, ventral and lateral view of the body of the earthworm showing mouth opening.

OR

Describe the female reproductive system of a cockroach.

Ans.



Or

- The female reproductive system consists of two large ovaries, lying laterally in the 2nd - 6th abdominal segments.
- Each ovary is formed of a group of eight ovarian tubules or ovarioles, containing a chain of developing ova.
- Oviducts of each ovary unite into a single meridian oviduct(also called vagina) which opens into the genital chamber.
- A pair of spermatheca is present in the 6th segment which opens into the genital chamber.
- Sperms are transferred through spermatophores.
- Their fertilised eggs are encased in capsules called oothecae.

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13. What is a photosystem? Differentiate between the two types of photosystems in a higher plant.

Ans. A photosystem is constituted by a reaction centre, other chlorophylls and accessory pigments.

PS I	PS II
It is constituted by chlorophyll P_{700} and other pigment molecules which absorb light energy	It is constituted by chlorophyll P_{680} and accessory pigments that pass on light

and pass on to P_{700}	energy to P_{680}
The reaction centre is P_{700}	The reaction centre is P_{680}
It is involved in both cyclic and non cyclic photophosphorylation.	It is involved only in non-cyclic photophosphorylation.

14. Define the following
a) Functional residual capacity.
b) Expiratory capacity
c) Total lung capacity
Ans. (a) Functional residual Capacity – When a person inhales and exhales in a normal way, the volume of air that remains in the lungs is known as functional residual capacity.
(b)Expiratory Capacity – The volume of air that can be breathed out forcefully, after a normal inspiration, is called expiratory capacity.
(c)Total Lung Capacity – It refers to the volume of air accommodated in the lungs, at the end of a forceful inspiration; it is the sum of tidal volume, inspiratory reserve volume, expiratory reserve volume and residual volume.

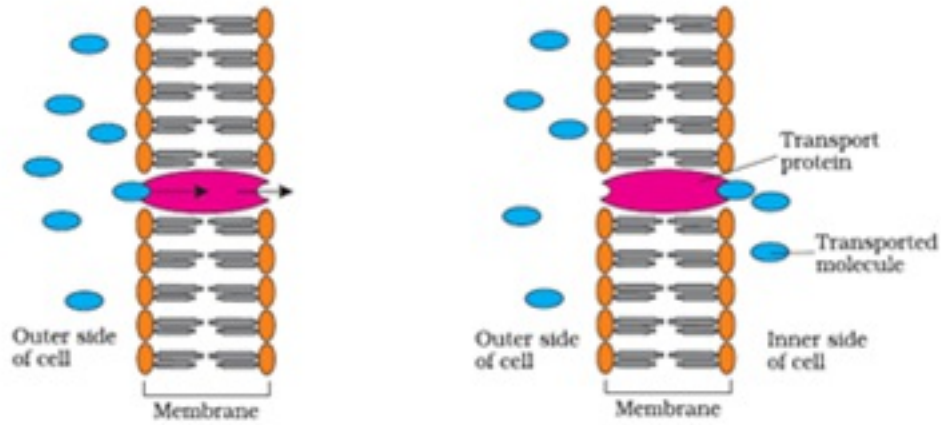
15. Name the following
(i) The smallest known living cells.
(ii) An acellular slime mould.
(iii) A flagellated protozoan.
(iv) A bilaterally symmetrical chrysophytes.
Ans.(i) Mycoplasma
(ii)Physarum
(iii)Trypanosoma
(iv)Navicula

16. Differentiate parenchyma from collenchyma. Enumerate the peculiar features that you find in phylum chordata.
Ans.

Parenchyma	Collenchyma
Cell wall is thin.	Cell wall shows thickening in the corners.
Its main function is storage of food material.	It gives mechanical support and flexibility to growing org**Ans.**
The cells have the power of division.	The cells do not have the power of division.
This is distributed in almost all parts of the plant.	It is distributed in the hypodermis of dicot stem.

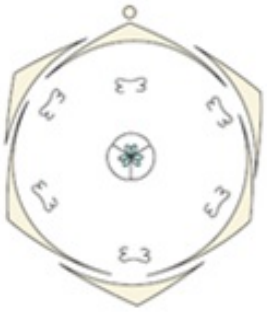
17. Show diagrammatically the facilitated diffusion.

Ans.



18. Draw the floral diagram of liliaceae.

Ans.



19. What are respiratory substrates? Name the most common respiratory substrate.

Ans. Respiratory substrates are those organic compounds, which are oxidized to yield energy. Glucose is the most common respiratory substrate. Beside glucose, amino acids, fats can be also used as respiratory substrate. The maximum energy is produced by fat per unit

mass in presence of sufficient oxygen.

20. Differentiate between red algae and green algae.
Ans.

Red Algae	**Green Algae**
They have characteristic pigments. R-phycoerythrin, phycocyanin, chlorophyll-a and chlorophyll-d.	They have characteristic pigments chlorophyll-a, chlorophyll-b, xanthophylls and carotene.
The reserve food materials are in the form of floridean starch.	The reserve food materials are in the form of pyrenoids and oil droplets.
Phycocolloids are present.	Phycocolloids are absent.
They live in very deep marine waters.	They live in moderate depths.

21. Radhika and Amina are good friends and study in same class. Radhika belongs to a rich family but Amina to a poor family. Radhika was poor in study but Amina was very intelligent. Rahika used to help him financially with her pocket money and Amina help her in study. Radhika parents do not like Amina but Radhika convinced them.
a. What values do you find in Radhika and Amina?
b. What are the possible cause of poverty in society?
c. Why Radhika's parents do not like the friendship of her with Amina?
Ans. a) Both Amina and Radhika are true to her friendship and help each other in what they have with them.
b) The main reason of poverty in certain section of society is due to more number of children, no education and absence of employment.
c) Some persons still have feeling about the high and low caste and religion and think that their child will be adversely affected due to different culture and religion.

Section – D

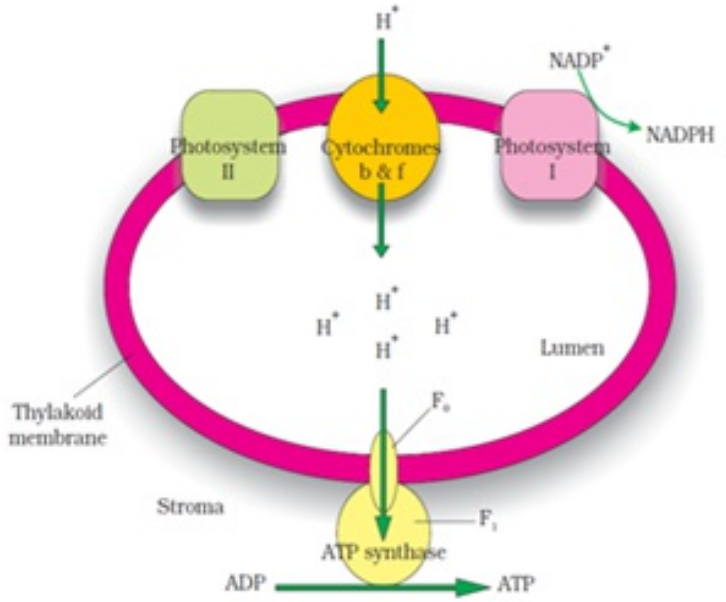
22. Explain chemiosmotic hypothesis.

Or

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

Ans. Chemiosmotic Hypothesis

It was put forward to explain the mechanism of ATP synthesis. ATP synthesis is linked to the development of a proton gradient across the membranes of thylakoids. When electrons are transported through ETS, the protons get accumulated inside the thylakoids membrane. These protons are passed across the membrane into stroma because protons are removed from the stroma for two reasons. Firstly the primary electron acceptor is located towards the outside of the membrane and transfers its electrons to the H carrier. So this molecule removes a proton from the stroma while transporting an electron and releasing it into the lumen or inner side of the membrane. Secondly, the enzyme NADP Reductase is located on the stroma along with the electron from PSI needed to be reduced to NADP.

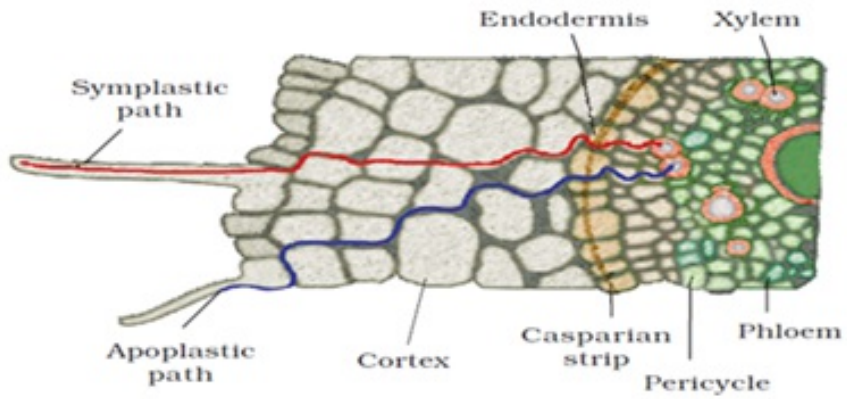


Thus as a result, the protons in the stroma get decreased creating a proton gradient across the thylakoids membrane. This gradient is important for ATP synthesis because energy is released by the breakdown of this gradient. The gradient gets broken due to the movement of protons across the membrane through trans membrane channel of the ATP synthase. The other portion of ATP synthase called F1 undergoes conformational changes with the energy provided by the breakdown of proton gradient and synthesizes ATP molecules.

Or

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. 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.

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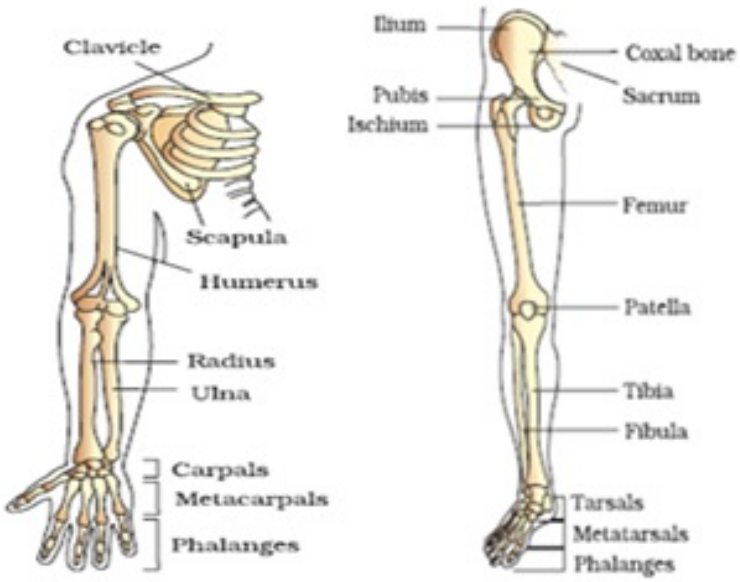
23. Draw the labelled diagram of pectoral and pelvic girdle.

Or

Explain different types of plastids, their pigments and functions.

Ans.



Or

Plastids are double membrane bound organelles of different shapes that are found only in plant cells and contain pigments and storage products. They are classified into three types namely:

a) Leucoplasts – These are oval, spherical, rod-like colourless plastids which are found in storage org**Ans.** Their main function is to store reserve materials like starch, proteins and fats.

b) Chromoplasts – These are coloured plastids containing yellow, red and orange pigments (carotene and xanthohyll). These are found in petals of flowers and skin of fruits. They attract agents for pollination and dispersal of fruits/seeds.

c) Chloroplasts – These are green plastids containing mainly chlorophylls and little carotene and xanthophylls. Their main function is photosynthesis and formation of starch.

Section-E (OTBA) Questions

24. OTBA Question 2 mark

25. OTBA Question 3 mark

26. OTBA Question 5 mark