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PRACTICE PAPER 03 (2024-25)

CHAPTER 05 THE FUNDAMENTAL UNIT OF LIFE

(ANSWERS)

SUBJECT: SCIENCE **MAX. MARKS : 40**

CLASS : IX **DURATION : 1½ hrs**

General Instructions:

(i). **All** questions are compulsory.
(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv). There is no overall choice.
(v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Which of these sentences are not a function of the Ribosome?
(I) It helps in the manufacture of protein molecules.
(II) It helps in the manufacture of enzymes.
(III) It helps in the manufacture of hormones.
(IV) It helps in the manufacture of starch molecules.
Options:
(a) (I) and (II) (b) (II) and (III) (c) (III) and (IV) (d) (IV) and (I)
Ans. (c) (III) and (IV)
As ribosomes are the site of protein synthesis and enzymes, they play an important role in protein synthesis. In addition, it produces amino acids, which polymerise to create proteins.

2. Which cell organelle plays a crucial role in detoxifying many poisons and drugs in a cell?
(a) Golgi apparatus (b) Lysosomes
(c) Smooth endoplasmic reticulum (d) Vacuoles
Ans. (c) Smooth endoplasmic reticulum
SER metabolises various toxic or poisonous substances such as drugs, aspirin, insecticides (DDT), petroleum products and pollutants.

3. A cell will swell up if:
(a) The concentration of water molecules in the cell is higher than the concentration of water molecules in surrounding medium.
(b) The concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell.
(c) The concentration of water molecules is same in the cell and in the surrounding medium.
(d) Concentration of water molecules does not matter.
Ans. (b) The concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell.
When concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell, the cell will swell up due to endosmosis.

4. Which of these is not related to endoplasmic reticulum?
(a) It behaves as a transport channel for proteins between nucleus and cytoplasm.
(b) It transport materials between various regions in cytoplasm.
(c) It can be the site of energy generation.
(d) It can be the site for some biochemical activities of the cell. A
Ans. (c) It can be the site of energy generation.

Mitochondria are the site of energy generation.

5. The undefined nuclear region of prokaryotes are also known as:
(a) Nucleus (b) Nucleolus (c) Nucleic acid (d) Nucleoid
Ans. (d) Nucleoid
The undefined nuclear region of a prokaryotic cell is called nucleoid. The prokaryotic cells lack true nucleus. A circular DNA lies naked in the cytoplasm.

6. Which of the following are covered by a single membrane?
(a) Mitochondria (b) Vacuole (c) Lysosome (d) Both (b) and (c)
Ans. (d) Both (b) and (c)
Vacuole and lysosome are covered by a single membrane while mitochondria, and plastid have double membrane.

7. The proteins and lipids, essential for building the cell membrane, are manufactured by
(a) Endoplasmic reticulum (b) Golgi apparatus
(c) Plasma membrane (d) Mitochondria K
Ans. (a) Endoplasmic reticulum
Rough Endoplasmic Reticulum (RER) is associated with the synthesis of proteins while Smooth Endoplasmic Reticulum (SER) is associated with the synthesis of lipids.

8. Select the odd one out.
(a) The movement of water across a semi permeable membrane is affected by the amount of substances dissolved in it.
(b) Membranes are made of organic molecules like proteins and lipids.
(c) Molecules soluble in organic solvents can easily pass through the membrane.
(d) Plasma membranes contain chitin sugar in plants.
Ans. (d) Plasma membranes contain chitin sugar in plants.
Explanation: Each cell is bounded by an extremely delicate, thin elastic living membrane, called the plasma membrane. The plasma membrane is made up of two layers of lipid (fat) molecules with protein molecules which is sandwiched between lipid layer.

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.
(a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.
(b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.
(c) Assertion is true but the Reason is false.
(d) Assertion is false but the Reason is true.

9. **Assertion (A):** Multicellular organisms have higher survival rate than unicellular organisms.
Reason (R): In Multicellular organism, dead cells are replaced by new cells.
Ans. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.
Multicellular organisms are made up of many cells. Death or injury of any cells can be replaced by new cells. Thus, because of increased efficiency, organization and division of labour, multicellular organisms have higher survival rate.

10. **Assertion (A):** Lysosomes are known as suicidal bag of cells.
Reason (R): Lysosomes contain powerful enzymes capable of breaking down all organic material.
Ans. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.

During the disturbance in cellular metabolism lysosomes may burst and the enzymes digest their own cell. Therefore, lysosomes are also known as suicidal bags. Lysosomes are able to do this because they contain powerful enzymes capable of breaking down all organic material.

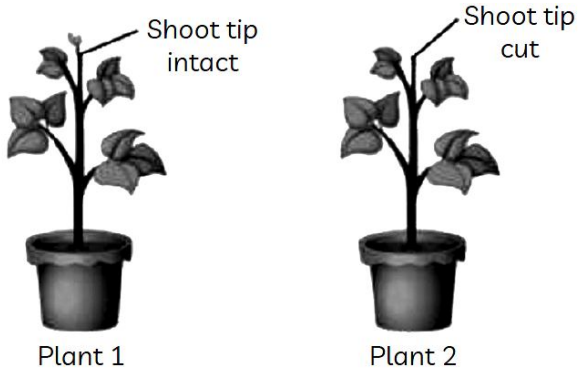
SECTION – B

Questions 11 to 14 carry 2 marks each.

11. In Biology practical class, the teacher asked Renuka and Sahil to keep the onion peel and RBC in two different beakers of hypotonic solution. Renuka noticed that the onion peel swelled while Sahil witnessed the RBCs explode quickly. Why did this happen? Give reason by supporting the activity performed by both of them.
Ans. Water will move inside the cell when the surrounding medium is hypotonic. Both of them observe that cells of onion peel and RBC get enlarged and swell. Since RBCs lack a plasma membrane, they quickly inflate and explode. Plant cells have a protective cell wall that prevents them from exploding. Hence,
(i) Renuka would see that the onion peel swelled.
(ii) Sahil would observe the RBC will burst when kept in a hypotonic solution.

12. (a) Name the two organelles in a plant cell that contain their own genetic material and ribosomes.
(b) If you are provided with some vegetables to cook, you generally add salt into vegetables during the cooking process. After adding salt, vegetables release water. What mechanism is responsible for this?
Ans. (a) Mitochondria and plastids both have genetic material and ribosomes of their own. Mitochondrial DNA and plastid DNA both contain genes that create proteins required for mitochondrial and plastid.
(b) Addition of salt creates a hypertonic solution in which the concentration of solute is high outside the cells. Thus, the water present inside the cells of vegetables is released. This occurs by the process of exosmosis.

13. Apical meristem is a type of tissues that helps plants grow in length. Tina took two identical potted plants and cut the shoot tip of one of them. She observed if the two plants grew in height after a week.



What was Tina trying to find out about shoot tips through her experiment?
Ans. Through her experiment, Tina wanted to find out whether cutting of shoot tip from a plant affects its growth or not. It does not get affected as the shoot tip has a special type of tissue known as meristem that divides rapidly and keep growing.

14. Why does the skin of your finger shrink when you wash clothes for a long time?
Ans. When we wash clothes, our hands are exposed to water for a long time. Our hands behave as a hypertonic solution and the outside of our hands behave as a hypotonic solution. Our skin behaves as a semi-permeable membrane as it is porous. So, actually the water is not absorbed here but just leaves and thus, it shrinks. Soap solution is a hypertonic solution i.e., more concentrated than our skin cells. The process is called exosmosis.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Give reasons:

(a) Mitochondria is called as the 'Powerhouse of the cell'.

(b) Vacuoles act as storage sacs inside a cell.

(c) Why lysosomes are called suicidal bags of the cell?

Ans. (a) Mitochondria help in the oxidation of food to release energy in the form of ATP. These ATP molecules act as energy currency and are transported to various parts of the cell requiring energy. This process is also called cellular respiration.

(b) Vacuole is an organelle that serves as a 'storage sac' of the cell. It is found in both plant and animal cells. It is a membranebound organelle. The major ingredient of the vacuole is water, which contains various organic and inorganic constituents.

(c) During the disturbance in cellular metabolism, the lysosomes may burst and the enzymes digest their own cell. Therefore, lysosomes are called suicidal bags of the cell.

16. (a) Write two points of difference between nuclear region of a bacterial cell and nuclear region of an animal cell.

(b) Which structure present in the nuclear region of a living cell bear genes?

Ans: (a) Differences:

Nuclear region of a bacterial cell (Prokaryotic cell)	Nuclear region of an animal cell (Eukaryotic cell)
(i) Nuclear region is poorly defined due to the absence of membrane, and known as nucleoid. (ii) Nucleolus is absent.	(i) Nuclear region is well-defined and surrounded by a nuclear membrane. (ii) Nucleolus is present.

(b) Chromosomes bear genes.

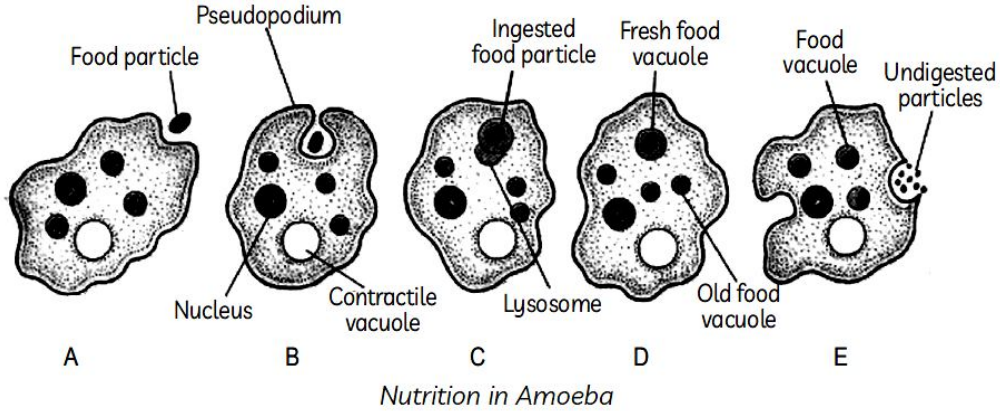
17. How does Amoeba take its food?

Ans. (i) Amoeba does not have any specific organ for taking food. The entire process is carried out by its flexible cell membrane.

(ii) Amoeba draws out their pseudopodia when it senses food particles.

(iii) Pseudopodia engulfs the entire food particle forming a food vacuole. This process is called endocytosis.

(iv) Various digestive juices secreted in the vacuole break down the food particles which are then absorbed into the cytoplasm by diffusion.



Nutrition in Amoeba

SECTION – D

Questions 18 carry 5 marks each.

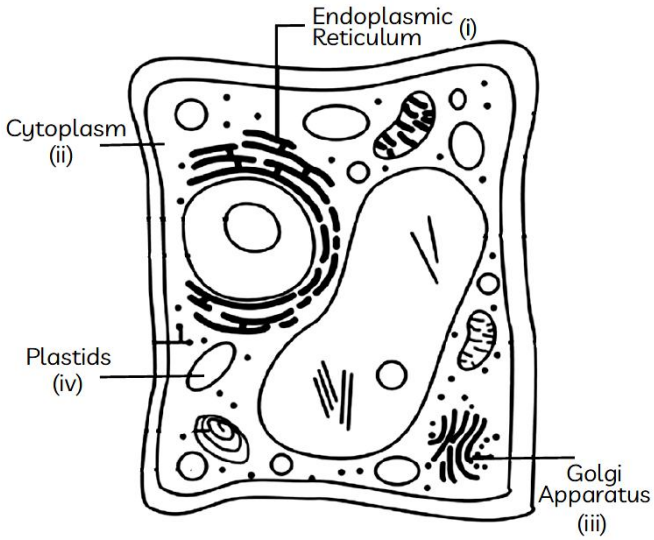
18. (a) Draw the structure of a plant cell and label the part which:

(i) have cisternae-like structures for transport and synthesis.

(ii) is a place where most biochemical reactions occur.

(iii) packages and delivers the material synthesised in a cell.

(iv) acts as a kitchen of the cell.
(b) Also differentiate this cell from an animal cell based on:
(i) Outer membranes
(ii) Presence of centrioles
Ans. (a) Parts are labelled below:



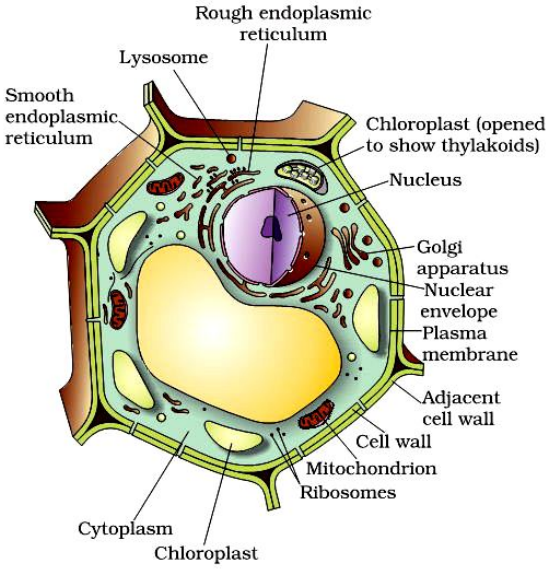
(b) (i) Plant cell has cell wall outside the cell membrane but the cell wall is absent in animal cell.
(ii) Centrioles are only found in animal cells not in plant cells.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Read the following information and answer the questions based on information and related studied concepts.

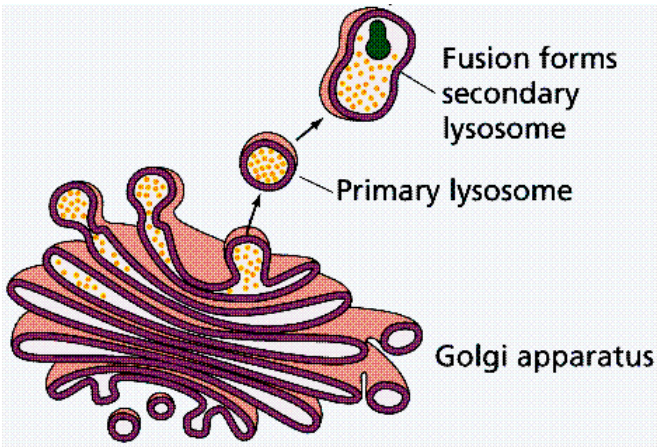
A membrane surrounds each cell, separating its contents from the outside world. To sustain their sophisticated structure and function, large and complex cells, such as those seen in multicellular animals, require a lot of chemical activity. These cells use membrane-bound tiny structures within themselves to keep different kinds of activities apart from one another. The cytoplasm is a jelly-like fluid that fills the space between the plasma membrane and the plasma membrane's outer layer, and it includes a variety of specialised cell organelles. Endoplasmic reticulum, Golgi apparatus, Lysosomes, Ribosomes, Nucleus, Chloroplast, Mitochondria, and Plastids are some of the organelles found in cells. For the cell, each of these organelles has a distinct purpose. An electron microscope is required to see some of these organelles. They're significant since they play a key role in cell function.



(a) Name any five cell organelles. (1)
(b) Name the jelly-like fluid substance present in cells. (1)
(c) What name is given to the functional segments of DNA? What is the function of these functional segments? (2)
Ans. (a) Endoplasmic Reticulum, Golgi apparatus, Lysosomes, Ribosomes, Nucleus, Chloroplast, Mitochondria and Plastids.
(b) Cytoplasm is a viscous liquid that fills each cell and is surrounded by the cell membrane. Water, salts and proteins make up the majority of it. The cytoplasm of eukaryotic cells contains all of the materials inside the cell and outside the nucleus.
(c) The functional segments of DNA are genes. The genes are functional units of heredity. They carry the hereditary information from one generation to the next. They also control the structure and metabolism of the body.

20. Read the given passage and answer the questions that follow based on the passage and related studied concepts.

Camilo Golgi was the first to define the Golgi apparatus, which consists of a system of membrane-bound vesicles (flattened sacs) stacked almost parallel to each other called cisternae. These membranes are frequently coupled to the ER membranes, making up a complicated cellular membrane system. The Golgi apparatus packages and transports the material synthesised near the ER to numerous targets inside and beyond the cell. Storage, modification and packing of objects in vesicles are among its functions. Complex sugars can be produced from simple sugars in the Golgi apparatus in some instances. The development of lysosomes is also aided by the Golgi apparatus.



(a) What will happen if the organelle shown above is removed? (2)
(b) Name the cell organelle which has (i) Cristae (ii) Cisternae (1)
(c) What is the importance of cell sap present in vacuoles of plant cell? (1)
Ans. (a) The above figure shows Golgi apparatus. in the absence of the Golgi apparatus, lysosomes will not be formed and damaged membranes such as the cell wall and plasma membrane will not be repaired. Furthermore, the acrosome production of sperm will not occur, preventing sperm from entering the egg. These are the conditions which will occur in the absence of Golgi apparatus.
(b) The cell organelle which has:
(i) Cristae – Mitochondria
(ii) Cisternae – Golgi apparatus
(c) Vacuoles of plant cells are full of cell sap.
Importance of cell sap as follows:
(i) They provide turgidity and rigidity of the cell.
(ii) They store substances like amino acids, sugars, various organic acids and some proteins which are important for the life of the plant cell.