



INDIAN SCHOOL AL WADI AL KABIR

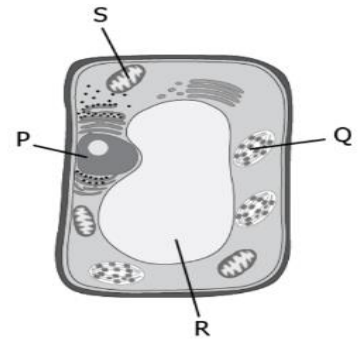


Class: IX	DEPARTMENT OF SCIENCE -2024-25 SUBJECT: BIOLOGY	DATE OF COMPLETION: 30.05.2024
WORKSHEET NO:2 WITH ANSWERS	TOPIC: THE FUNDAMENTAL UNIT OF LIFE-PART II	A4 FILE FORMAT (PORTFOLIO)
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

I. OBJECTIVE TYPE QUESTIONS:

1. The image shows a plant cell. Which marked part is responsible for the generation of energy in the cell?

- (a) P
- (b) Q
- (c) R
- (d) S



2. How does endoplasmic reticulum help in transporting protein between various regions of the cytoplasm?

- (a) By forming a network of membrane-bound tubes in the cytoplasm.
- (b) By occupying most of the space in the cytoplasm.
- (c) By generating small transport cisternae throughout the cell.
- (d) By directing all cell organelles to perform the same biochemical activity.

3. Proteins are synthesized near the endoplasmic reticulum. Where are these proteins transported further in the cell?

- (a) To the nucleus
- (b) To Golgi body
- (c) To mitochondria
- (d) To the cell membrane

4. X is a double membrane organelle that oxidises food present in the cell to release energy. X is:

- (a) Nucleus
- (b) Endoplasmic reticulum
- (c) Mitochondrion
- (d) Chloroplast

5. Which of the following function is performed by smooth endoplasmic reticulum?

- (a) It helps expel excess water and waste out of the cell.
 - (b) It helps produce ATP molecules.
 - (c) It helps digest small foreign particles.
 - (d) It helps detoxify the drugs.
6. A large amount of energy is required by the cell to carry out various cellular processes. Which part of mitochondria helps generate enough energy required for various chemical activities and how?
- (a) The folds present in the inner mitochondrial membrane decrease the surface area for more ATP production.
 - (b) The folds present in the inner mitochondrial membrane increase the surface area for more ATP production.
 - (c) The folds present in the outer mitochondrial membrane increase the surface area for more ATP production.
 - (d) The folds present in the outer mitochondrial membrane decrease the surface area for more ATP production.
7. In summer, the leaves of a potted plant droop when the soil becomes dry. Which cell organelle makes the leaves droop?
- (a) Nucleus, as it stops making DNA.
 - (b) Cell wall, as it starts to shrink.
 - (c) Lysosome, as it is releasing the digestive enzymes.
 - (d) Vacuole, as it loses all the water.
8. Which part of the cell serves as the intracellular highway?
- (a) Endoplasmic reticulum
 - (b) Golgi apparatus
 - (c) Cell membrane
 - (d) Mitochondria

For questions 9 to 12, two statements are given-one labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the options (i), (ii), (iii) and (iv) as given below:

- (i) Both A and R are true and R is the correct explanation of the assertion.
- (ii) Both A and R are true but R is not the correct explanation of the assertion.
- (iii) A is true but R is false.
- (iv) A is false but R is true.

9. **Assertion (A):** Mitochondria and chloroplasts are semiautonomous organelles.

Reason (R): They contain their own DNA but lack protein-synthesizing machinery.

10. **Assertion (A):** Mitochondria are known as the powerhouse of the cell.

Reason(R): Mitochondria produce cellular energy in the form of ATP.

11. **Assertion (A):** Vacuoles are storage sacs for solid or liquid contents.

Reason(R): In amoeba, the vacuoles do not help in expelling excess water from the cell.

12. **Assertion (A):** The endoplasmic reticulum which has ribosomes is called smooth endoplasmic reticulum (SER).

Reason(R): SER is mainly involved in synthesis of lipids.

II. VERY SHORT ANSWER TYPE QUESTIONS (2M)

13. What is lacking in a virus which makes it dependent on a living cell to multiply?
14. What is the significance of pores present on the nuclear membrane?
15. Which organelle is called the 'digestive bags' of the cell?
16. i) Name two cell organelles having double-membrane envelopes.
ii) Write the key functions of ribosomes present in active cells.
17. State the role of mitochondria. Explain the structure of mitochondria.
18. Grass looks green, and papaya appears yellow. Which is the cell organelle responsible for this? Write the structural features of this organelle.

III. SHORT ANSWER TYPE QUESTIONS (3M):

19. Who coined the term Golgi apparatus? Name one cell organelle that is formed by Golgi apparatus. Write any two functions of Golgi apparatus.
20. What are the similarities and dissimilarities between mitochondria and plastids?
21. Differentiate between rough and smooth endoplasmic reticulum. How is the endoplasmic reticulum important for membrane biogenesis?
22. Describe the structure of plastids with special reference to their types.

IV. LONG ANSWER TYPE QUESTIONS (5M):

23. Draw a neat labelled diagram of an animal cell.
24. Illustrate a plant cell as seen under an electron microscope. How is it different from animal cells?
25. a) What is cell division?
b) Why is cell division necessary?
c) State the differences between mitosis and meiosis.

V. SOURCE BASED/CASE-BASED QUESTION (4 MARKS):

The membrane-bound compartment in the cytoplasm is known as the **vacuole**. Vacuoles are storage sacs for solid or liquid contents. In plant cells vacuoles are full of cell sap and provide turgidity and rigidity to the cell. Many substances of importance in the life of the plant cell are stored in vacuoles. Tonoplast is the given name of the isolated membrane that surrounds the vacuole. In plant cells, vacuoles possess the capacity to consume up to 90% of the entire cell volume. In plants, the tonoplast helps with the movement of various ions and other substances up concentration gradients and into the vacuole. The contractile vacuole in amoebas is crucial for excretion and maintaining water balance. Food vacuoles are created by enveloping the food particles in numerous cells,

- (a) What are vacuoles?
- (b) Mention the role of vacuoles in unicellular organisms.
- (c) What happens when a plant cell's vacuole is empty?
- (d) Elaborate the specialised role of vacuoles in unicellular organisms.

ANSWERS

I	OBJECTIVE TYPE QUESTIONS:
1.	(d)S
2.	(a) By forming a network of membrane-bound tubes in the cytoplasm.

3.	(b) To Golgi body								
4.	(c) Mitochondrion								
5.	(d) It helps detoxify the drugs.								
6.	(b)The folds present in the inner mitochondrial membrane increase the surface area for more ATP production.								
7.	(d)Vacuole, as it loses all the water.								
8.	(a) Endoplasmic reticulum								
9.	(iii)A is true but R is false.								
10.	(ii)Both A and R are true but R is the correct explanation of the assertion.								
11.	(iii)A is true but R is false.								
12.	(iii)A is true but R is false.								
II	VERY SHORT ANSWERS TYPE QUESTIONS (2M)								
13.	Viruses lack any membranes and hence do not show characteristics of life until they enter a living body and use its cell machinery to multiply.								
14.	These pores allow the movement of specific molecules between the nucleus and cytoplasm.								
15.	Lysosomes are cell organelles found in eukaryotic cells. They are also called suicidal bags. They contain digestive enzymes which break down the waste material and foreign particles. They also destroy the cell after it has died.								
16.	(i) Mitochondria and plastids (ii) Ribosomes present in active cells are the sites for protein synthesis.								
17.	The energy required for various chemical activities needed for life is released by mitochondria in the form of ATP (Adenosine triphosphate) molecules. Mitochondria have two membrane coverings. The outer membrane is porous while the inner membrane is deeply folded. These folds increase the surface area for ATP-generating chemical reactions.								
18.	Plastids - Chromoplasts – chloroplast Structure: -Each chloroplast has a double membrane. The inner matrix called stroma has a flattened stack of thylakoids called grana. Chloroplast has their own DNA and ribosomes.								
III	SHORT ANSWER TYPE QUESTIONS (3 M):								
19.	Camillo Golgi coined the term Golgi apparatus. Lysosomes is the only cell organelle that is formed by Golgi apparatus. Functions of lysosomes are: i) Package and dispatches materials synthesised by ER. ii) Its functions also include the storage, modification and packaging of products in vesicles.								
20.	Similarities between mitochondria and plastids are: -Mitochondria and plastids are double membrane-bound organelles. -Mitochondria and plastids have their own DNA and ribosomes for protein synthesis hence they are called semi-autonomous cell organelles.								
	<table border="1"> <thead> <tr> <th>Mitochondria</th> <th>Plastid</th> </tr> </thead> <tbody> <tr> <td>Found in all eukaryotic cells</td> <td>Found in only plant cells</td> </tr> <tr> <td>Produces ATP</td> <td>Produces glucose and stores it as starch</td> </tr> <tr> <td>The main function is cell respiration</td> <td>Main organelle for photosynthesis</td> </tr> </tbody> </table>	Mitochondria	Plastid	Found in all eukaryotic cells	Found in only plant cells	Produces ATP	Produces glucose and stores it as starch	The main function is cell respiration	Main organelle for photosynthesis
Mitochondria	Plastid								
Found in all eukaryotic cells	Found in only plant cells								
Produces ATP	Produces glucose and stores it as starch								
The main function is cell respiration	Main organelle for photosynthesis								

	Smaller in size	Comparatively larger in size
	Pigments are absent	Pigments are present

21.	Rough Endoplasmic Reticulum	Smooth Endoplasmic Reticulum
	1. Ribosomes are attached to its surface.	1. Ribosomes are not attached to its surface.
	2. Help in protein synthesis	2. Help in lipid synthesis
	3. Usually present near the nucleus.	3. Usually present near the cell membrane.
	4. Composed of Cisternae.	4. Composed of tubules.

Proteins and lipids synthesised in ER are used for producing new cell membrane during cell division and this process is termed as membrane biogenesis.

22. Plastids are only found in plant cells. They are of two types: -

a) Chromoplasts (coloured plastids) and leucoplasts (white or colourless plastids)

Chromoplasts containing chlorophyll are called chloroplast –It is green coloured plastids.

Chloroplasts are double membrane organelles containing two distinct regions:

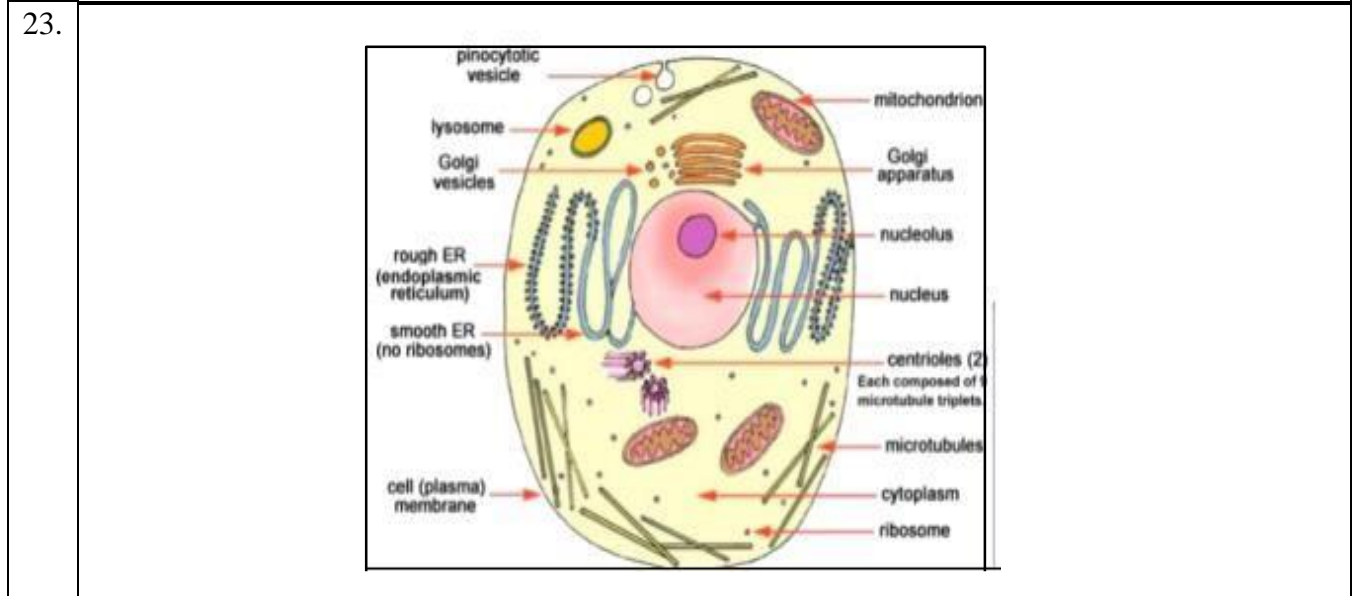
1. Grana are stacks of membrane-bounded flattened sacs called thylakoids containing chlorophyll.
2. Stroma is the homogenous matrix in which grana are embedded. Chlorophyll actually helps in capturing solar energy and converting it to the chemical energy of food.

The functions of plastids are as follows: -

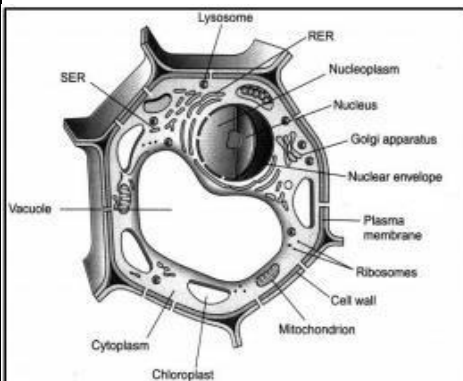
a) Chloroplast helps in photosynthesis. Chloroplast also contains various yellow or orange pigments in addition to chlorophyll. These coloured plastids impart colour to flowers. Plastids contain their own DNA and ribosomes i.e.; they have their own protein-synthesising machinery. They are also self-replicating organelles.

b) Leucoplast – is a colourless plastid and stores starch, oils and protein granules.

IV LONG ANSWER TYPE QUESTIONS (5M):



24.
a
& b



Plant cell	Animal cell
1. Cell wall is present. The cell membrane is surrounded by the cell wall.	1. Cell wall is absent.
2. Plastids are present.	2. Plastids are absent.
3. A large vacuole is present in the centre.	3. Vacuoles are absent; however, if present, they are small.
4. Cytoplasm is not so dense.	4. Cytoplasm is denser and more granular and almost fills the entire cell.
5. Golgi apparatus has smaller units called dictyosomes.	5. Golgi apparatus is highly complex and prominent.

25.

- a) Cell division is a process by which a parent cell divides into two or more daughter cells.
 b) Cell division is necessary because of the following reason: -
 -A cell has to divide to maintain continuity from one generation to another generation.
 -In multicellular organisms, it plays an important role in the formation of gametes.
 -Old and worn-out cells are regularly repaired by means of cell division.
 -In unicellular organisms like amoeba, cell division is the means of reproduction whereas in multicellular organisms; it is the means of tissue growth and maintenance.

c)

Mitosis	Meiosis
It takes place in somatic cells.	It takes place in germ cells at the time of gamete formation.
Two daughter cells are formed.	Four daughter cells are formed.
The daughter cells have the same number of chromosomes as the mother cell.	The new cells only have half the number of chromosomes than that of the mother cells.
It helps in the growth and repair of tissues in organisms.	It is necessary for sexual reproduction.

VI SOURCE BASED/CASE BASED QUESTION (4 MARKS):

- a) A vacuole is a membrane-bound cell organelle. Vacuoles are storage sacs for solid or liquid contents.
 b) In plant cells, vacuoles are full of cell sap and provide turgidity and rigidity to the cell. Vacuoles also help maintain water balance.
 c) The water loss reduces the cell turgor. As a result, the plant wilts.
 d) The contractile vacuole in amoeba is crucial for excretion and maintaining water balance. The food vacuole contains the food consumed by the organism.

PREPARED BY:
Ms SREEJA ARAVINDAKSHAN

CHECKED BY:
HoD SCIENCE