
	INDIAN SCHOOL AL WADI AL KABIR	
Class: IX	DEPARTMENT OF SCIENCE -2023-24 SUBJECT: BIOLOGY	DATE OF COMPLETION: 25.5.23
WORKSHEET NO:1 WITH ANSWERS	TOPIC: THE FUNDAMENTAL UNIT OF LIFE-PART I	A4 FILE FORMAT (PORTFOLIO)
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

I. OBJECTIVE TYPE QUESTIONS (1 MARK):

1. Cells present in living organism differ in:
 - a) Numbers
 - b) Shape
 - c) Size
 - d) All of these

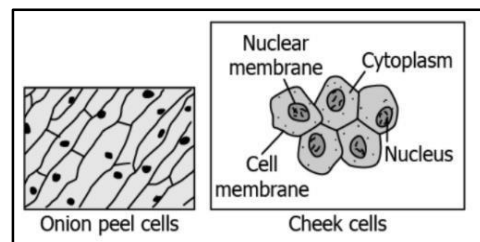
2. Plant cell wall is mainly composed of:
 - a) Sugars
 - b) Cellulose
 - c) Proteins
 - d) Lipids

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.

4. What is a basis for differentiation of a prokaryotic cell from a eukaryotic cell?
 - a) Presence or absence of cytoplasm
 - b) Presence or absence of cell membrane
 - c) Presence or absence of genetic material
 - d) Presence or absence of nuclear membrane.

5. The image shows cells in the onion peel and human cheek. What can be understood by observing these cells?

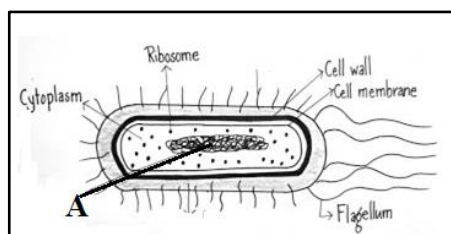
- a) All living things are made up of cells that look similar.
- b) All living things are made up of cells that are structurally similar but functionally different.
- c) All living things are made up of cells that look different from each other.
- d) None of the above.



6. The main function of a plasma membrane is to:

- a) Prevent water from entering or leaving.
- b) Control what goes into and out of the cell.
- c) Act as a sieve, allowing only lipids to pass.
- d) Move the cell from place to place.

7. In the diagram of the prokaryotic cell shown, the region labelled (A) is called the:



- a) Nucleoid
- b) Cytoplasm
- c) Capsule
- d) Plasma Membrane

8. When solute concentration is higher in the external solution than the solution is:

- a) Hypotonic
- b) Isotonic
- c) Hypertonic
- d) None of above

9. The cell membrane is composed primarily of:

- a) Cellulose
- b) Chitin
- c) Lipids
- d) Lipids and proteins

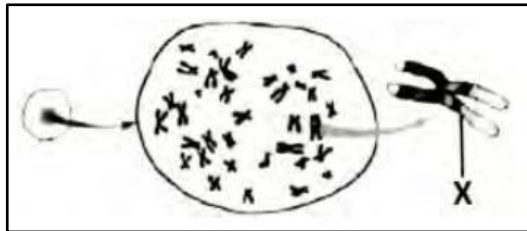
10. What will happen to an animal cell placed in a concentrated salt water solution?

- a) The cell will shrink
- b) The cell will expand
- c) The cell will burst
- d) The cell will shrink and then expand and then shrink again

11. Cell theory states that all organisms are made up of one or more similar units of organisation called cells. Which of the following organisms do not strictly adhere to this theory?

- a) Protozoa
- b) Bacteria
- c) Viruses
- d) Algae

12. The diagram below shows a magnified view of a particular part of a human cell. Name the part labelled X.



- a) Ribosome
- b) Chromosome
- c) Nucleoplasm
- d) Mitochondrion

II. ASSERTION AND REASONING:

For the questions 13 to 15, 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.

13. **Assertion (A):** The shape of the cells are of different types ranging from circular, elongated, tubular, oval, cylindrical, etc.

Reason (R): The shape of the cells varies according to the specific function they perform.

14. **Assertion (A):** Cell wall is not found in animal cell.

Reason (R): Animal cells are covered by cell membrane.

15. **Assertion (A):** Cell wall is a non-living part of the cell.

Reason(R): It does not offer protection, definite shape and support.

III.VERY SHORT QUESTIONS (2 MARKS)

16. How does fungi and bacteria withstand much greater changes in the surrounding medium than animal cells?

17. Differentiate between diffusion and osmosis.

18. What happens to a plasmolysed cell when it is placed in water?

19. Two beakers A and B contain plain water and concentrated sugar solution respectively. Equal number of dried raisins and fresh grapes are kept in A and B for a few hours and then taken out. Explain the reason for the difference in the physical appearance of raisins/grapes which were taken out of the two beakers.

IV. SHORT ANSWER QUESTIONS (3 MARKS):

20. In brief state what happens when:

i) Dry apricots are left for some time in pure water and later transferred to sugar solution.

ii) The plasma membrane of a cell breaks down.

iii) Rheo leaves are boiled in water first and then a drop of sugar syrup is put on it.

21. Distinguish between hypotonic solution, isotonic solution and hypertonic solution.

22. Give three differences between plasma membrane and the cell wall.

V. LONG ANSWER TYPE QUESTIONS (5 MARKS):

23. a) Explain in detail what do you know about the structure of nucleus.

b) Draw a neat labelled diagram of a prokaryotic cell.

24 a) Describe the process of diffusion of O_2 and CO_2 through the cell membranes.

b) Define plasmolysis.

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

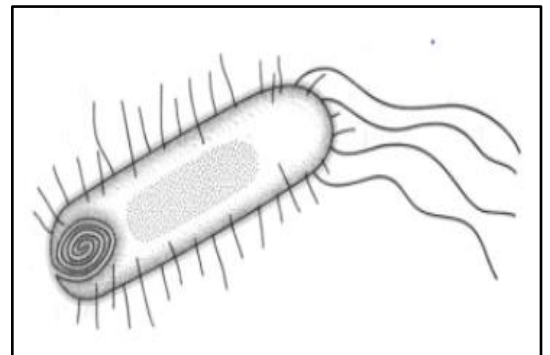
25. Mohan had a biology practical exam. The biology laboratory in his school had lots of microscopes of different precision. When he reached the laboratory, he found that many microscopes were already mounted with a slide. Just for fun, he went and looked at a slide through the microscope and found the image given alongside. He wasn't able to identify the organism or type of organism, so he called his friend Shyam to look at the slide. Shyam found out immediately what kind of organism this was.

a) Identify the organism as prokaryotic or eukaryotic.

b) How did Shyam find out the kind of organism?

c) Give two examples of such kind of organisms.

OR



c) State two point of differences between prokaryotic and eukaryotic cell.

25. Cell is the building block of all living matter. Cells vary considerably with respect to their shapes, sizes, functions and types. Some cells may even change their shapes and size as per the requirement. Some cells have fixed shape which may be spherical, oval, elliptical, spindle shaped, polygonal etc. Cells of certain organisms such as Amoeba have irregular shape. Basically, the shape of a cell is mainly dependent upon the function which it has to perform in the body of an organism. Cells vary largely in size. The range of cell size is from 0.1 micrometer to 100 cm. Thus, some cells can be seen through naked eye, while some cells are of microscopic size. However, the size of a particular cell remains constant. The increase in size of an organism means an increase in number of cells which by cell division, about which you will learn later.

- i) Who proposed the cell theory?
- ii) Why are the cells differently shaped?
- iii) State the postulates of cell theory.

OR

- iii) Name the cells which can change its shape.

VII. BOARD BASED QUESTIONS:

26. How does endocytosis help an organism like amoeba?

27. Why is the plasma membrane called as selectivity permeable membrane? Write one function of it.

ANSWERS

	<u>I. OBJECTIVE TYPE QUESTIONS (1 MARK):</u>		
1.	d) All of these		
2.	b) Cellulose		
3.	b) The concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell.		
4.	d) Presence or absence of nuclear membrane.		
5.	c) All living things are made up of cells that look different from each other.		
6.	b) Control what goes into and out of the cell		
7.	a) Nucleoid		
8.	c) Hypertonic		
9.	d) Lipids and proteins		
10.	a) The cell will shrink		
11.	c) Viruses		
12.	b) Chromosome		
	<u>II. ASSERTION AND REASONING(1 MARK):</u>		
13.	(i)Both A and R are true and R is the correct explanation of the assertion.		
14.	(ii)Both A and R are true but R is not the correct explanation of the assertion.		
15.	(iii)A is true but R is false.		
	<u>III.VERY SHORT QUESTIONS (2 MARKS)</u>		
16.	<p>The cells of plants, fungi and bacteria are surrounded by the cell wall. The cell walls of fungi, plants, and bacteria allow them to take up water via osmosis when they are placed in hypotonic media or a medium that is more dilute than their internal environments. The presence of cell walls outside the cell membrane allows these cells to tolerate high internal pressures. Hence, when these cells are placed in hypotonic solutions they swell up but do not burst.</p>		
17.	Basis of Comparison Meaning	Diffusion It refers to the movement of molecules from a region of higher concentration to the lower concentration.	Osmosis It is the movement of a solvent (mostly water) from the region of higher concentration to lower concentration through semi permeable membrane.

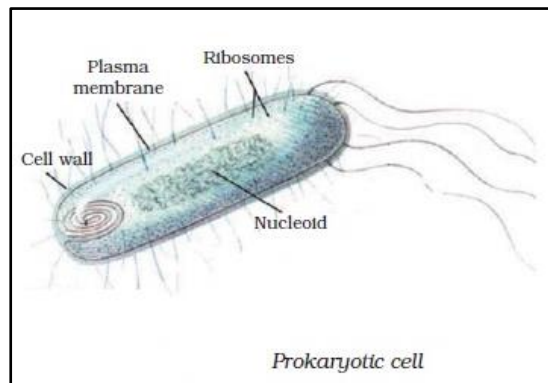
	Medium	It takes place In any medium of solid, liquid or gas	It takes place only in a liquid medium
	Semipermeable membrane	Does not require it	Requires a semi-permeable membrane
	Function	Exchange of gases during respiration in animals and transpiration and photosynthesis in plants	Maintains the water at the cellular level in animals, maintains the turgidity in plants and offers mechanical support
	Example	The scent of perfume filling a whole room	Plant root hairs taking up water
18.	When a plasmolysed cell is placed in water, the cell absorbs water from outside due to difference in solute concentration inside and outside the cell. By absorbing water the cell becomes turgid.		
19.	Raisins in beaker A with plain water will get swollen due to endosmosis while grapes in beaker B with concentrated sugar solution will get shrink due to exosmosis.		
<u>IV. SHORT ANSWER QUESTIONS (3 MARKS):</u>			
20.	<p>i) The apricots swell due to osmosis initially and when transferred to sugar solution shrink again due to exosmosis.</p> <p>ii)It would lead to scattering of cell organelles and there will be no functioning of the organelles.</p> <p>iii)There will be no change in cell shape or size because the cells are dead due to boiling.</p>		
21.	Hypotonic solution If the medium surrounding the cell has a higher water concentration than the cell, meaning that the outside solution is very dilute, the cell will gain water by osmosis. Such a solution is known as a hypotonic solution.	Isotonic solution If the medium has exactly the same water concentration as the cell, there will be no net movement of water across the cell membrane. Such a solution is known as an isotonic solution.	Hypertonic solution If the medium has a lower concentration of water than the cell, meaning that it is a very concentrated solution, the cell will lose water by osmosis. Such a solution is known as a hypertonic solution.
22.	<p>1. Cell membrane is present in all cells while cell wall is only present in plants, bacteria, fungi and algae.</p> <p>2. Cell wall is made up of cellulose whereas cell membrane is made up of lipids and proteins.</p> <p>3. Cell wall is non-living whereas cell membrane is living.</p>		
<u>V. LONG ANSWER TYPE QUESTIONS (5 MARKS):</u>			
23.	a) Structure of nucleus :		

1. It is large and well organized in structure which controls all the cell activities and called as brain of the cell.
2. The nucleus contains a covering layer called a **nuclear envelope** which covers all the contents of the nucleus.
3. A nuclear membrane is a selectively permeable membrane.
4. The nucleus contains a dense network of fine fibrous called chromatin.
5. Chromatin is made up of DNA and nuclear proteins.
6. The nucleus contains nucleic acids such as DNA and RNA.

Functions of the nucleus :

1. The chromatin part of the nucleus possesses all genetic information that is required for the growth and development of an organism, reproduction, metabolism, and behavior.
2. It plays a central role in cellular reproduction.

b)



24. a) CO_2 is a cellular waste which accumulates in high concentrations inside the cell and needs to be excreted out. In the cell's external environment, the concentration of CO_2 is low as compared to inside of the cell. As soon as there is a difference in concentration of CO_2 inside and outside the cell, CO_2 tends to move out of it from a region of higher concentration to a region of lower concentration by the process of diffusion. Similarly, O_2 enters the cell by the process of diffusion when the level or concentration of O_2 inside the cell decreases with respect to the outside. Thus, diffusion plays an important role in gaseous exchange between the cells as well as the cell and its external environment.
- b) Plasmolysis is the process of shrinkage or contraction of protoplasm of a plant cell as a result of loss of water from the cell.

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

25. a) Prokaryotic cell
 b) Shyam saw a poorly defined nuclear region due to the absence of a nuclear membrane. It is the characteristic of a prokaryotic cell.
 c) Bacteria and cyanobacteria
 or

	<p>c)</p> <table border="1" data-bbox="375 226 1468 541"> <thead> <tr> <th data-bbox="380 233 919 289">Prokaryotic Cell</th> <th data-bbox="919 233 1463 289">Eukaryotic</th> </tr> </thead> <tbody> <tr> <td data-bbox="380 289 919 535"> 1. Size: Generally small (1–10 μm) ($1\mu\text{m} = 10^{-6} \text{ m}$) 2. Nuclear region is poorly defined due to absence of a nuclear membrane and known as nucleoid. 3. There is a single chromosome. 4. Membrane-bound cell organelles absent. </td> <td data-bbox="919 289 1463 535"> 1. Size: Generally large (5–100 μm) 2. Nuclear region well defined and surrounded by a nuclear membrane. 3. There are more than one chromosomes. 4. Membrane-bound cell organelles present. </td> </tr> </tbody> </table>	Prokaryotic Cell	Eukaryotic	1. Size: Generally small (1–10 μm) ($1\mu\text{m} = 10^{-6} \text{ m}$) 2. Nuclear region is poorly defined due to absence of a nuclear membrane and known as nucleoid. 3. There is a single chromosome. 4. Membrane-bound cell organelles absent.	1. Size: Generally large (5–100 μm) 2. Nuclear region well defined and surrounded by a nuclear membrane. 3. There are more than one chromosomes. 4. Membrane-bound cell organelles present.
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26.	<p>a) Matthias Schleiden, Theodor Schwann and Rudolf Virchow</p> <p>b) Cells modify themselves according to the function they perform. Therefore, different cells have different shapes. For example, nerve cells have long processes called axons, as they have to carry information to long distances.</p> <p>c) Postulates of Cell theory are:</p> <ol style="list-style-type: none"> 1. All living organisms are made up of cells or the products of the cells. 2. Cells are the fundamental building blocks of tissues, organs, and entire functioning organisms. 3. New cells are formed through division in the pre-existing cells. <p>OR</p> <p>c) WBC and amoeba</p>				
<u>VII. BOARD BASED QUESTIONS:</u>					
27	It helps amoeba in engulfing food particles with help of pseudopodia.				
28.	The cell membrane or plasma membrane is a biological membrane that separates the interior of the cell from the outside environment. The plasma membrane is called as selectively permeable membrane because it regulates the movement of substances in and out of the cell. It means that the plasma membrane allows some material to pass through it while at the same time it blocks other material from entering through it.				

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