INDIAN SCHOOL AL WADI AL KABIR

Class: IX	**DEPARTMENT OF SCIENCE -2021-22** **SUBJECT: BIOLOGY**	DATE OF COMPLETION: 06.05.2021
WORKSHEET NO:1 WITH ANSWERS	**TOPIC:** **THE FUNDAMENTAL UNIT OF LIFE**	**A4 FILE FORMAT** **(PORTFOLIO)**
CLASS & SEC:	**NAME OF THE STUDENT:**	**ROLL NO.**

I OBJECTIVE TYPE QUESTIONS

Ia. Fill in the blanks:

1. Plasma membrane is made up of _____ and _____.
2. _____ and _____ are the structures found in plant cells but not in animal cells.
3. _____ organelle is associated with ribosome formation.
4. _____ is called the energy currency of the cell.
5. _____ is the plastid which stores starch, oils and protein granules.

Ib. Multiple choice questions:

6. Anil has bacterial infection. Which part of the cell will help him eliminate bacteria from his body and how?
   a)Vacuoles as they can uptake any material and store it.
   b) Vacuoles as they can expel substance out of the cell.
   c) Lysosomes as they have digestive enzymes to breakdown foreign material.
   d) Lysosomes as they can destroy their own cell.

7. 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.

8. The table lists some functions performed by some cell structures.

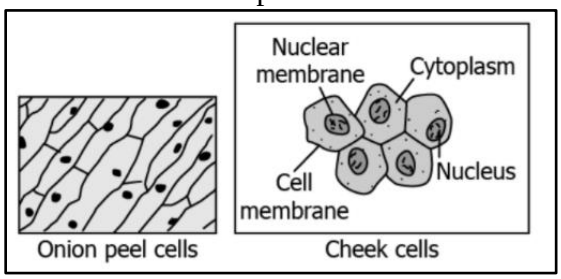
P-It separates the contents of the cell from the surroundings.
Q-It is a site where many cellular processes occur.
R-It controls the process of cell division.
S- It controls the movement of substances in and out of the cells.

Which option shows the organelle correctly matched with the respective function?

a) Cytoplasm- Q and S, nucleus- P, plasma membrane- R
b) Cytoplasm- Q and R, nucleus- P, plasma membrane- S
c) Cytoplasm- Q, nucleus- R, plasma membrane- S and P
d) Cytoplasm- R, nucleus- Q, plasma membrane- S and P

9. Which of the following is an example of a prokaryote?
   a) Fungi
   b) Algae
   c) Bacteria
   d) Protozoa

10. 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.

Ic. ASSERTION AND REASONING:

For the questions 11to 13,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.

11. **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.

12. **Assertion (A):** Mitochondria are known as the power house of the cell.
Reason(R): Mitochondria are strange organelles in the sense that they have their own DNA and ribosomes.

13. **Assertion (A):** Vacuoles are storage sacs for solid or liquid contents.
Reason(R): In amoeba the vacuoles does not help in expelling excess water from the cell.

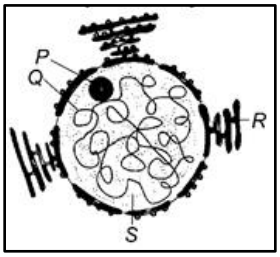
Id. PASSAGE BASED QUESTIONS:

14. Cell is the structural and functional unit of all organisms. Plant cells and animal cells have eukaryotic cells. Each of these cells have a true nucleus and also various membrane bound organelles such as ER, Golgi apparatus, mitochondria, plastids, vacuoles, lysosomes, ribosomes etc. Each organelle performs specific functions for e.g., nucleus helps in transmitting characters from parents to offspring.

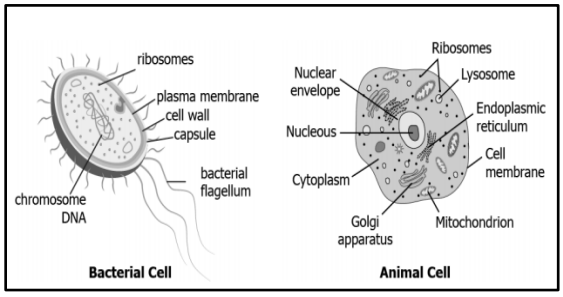
i) Well defined nucleus is absent in:
a) Plant cell
b) Animal cell
c) Prokaryotic cell
d) Eukaryotic cell

ii) 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 membrane bound organelles.

iii) All members of Gupta's family can roll their tongues. Which of the parts labelled in the given figure carries information regarding this characteristic?
a) P b) Q c) R d)S



iv) The image shows a bacterial cell and an animal cell.



Based on the structures, a student claims that the animal cell contains complex structures that are absent in the bacterial cell. Which statement can the student make to support the claim?
a)Animal cell contains flagella that aids in locomotion that is absent in case of a bacterial cell.
b) Nuclear material of the bacterial cell is not enclosed in a nuclear envelope as in case of an animal cell.
c) Cytoplasmic content of the bacterial cell is not enclosed in a thick cell wall as in case of an animal cell.
d) Animal cell contains ribosomes spread across the cell whereas in case of bacterial cell they are clumped together.

VERY SHORT ANSWERS TYPE QUESTIONS CARRYING 1 MARK EACH

15. What is the significance of pores present on the nuclear membrane?
16. What are the similarities and dissimilarities between mitochondria and plastid?
17. What is plasmolysis? What happens to a plasmolysed cell when it is placed in water?
18. How is a bacterial cell different from an onion peel cell?
19. Why is Golgi apparatus called the secretory organelle of the cell?
20. Which organelle is called the 'digestive bags' of the cell?

SHORT ANSWER TYPE QUESTIONS CARRYING 3 MARKS EACH

21. Differentiate between rough and smooth endoplasmic reticulum. How is endoplasmic reticulum important for membrane biogenesis?
22. Differentiate between diffusion and osmosis.
23. Draw a neat labelled diagram of a typical prokaryotic cell.
24. Write the functions of:
    i) Inner membrane of mitochondria.
    ii) Nucleus of the cell.
    iii) Ribosomes present in active cells.
25. Give three differences between plasma membrane and the cell wall.
26. Describe the structure of plastids with special reference to its types.
27. Draw a neat labelled diagram of animal cell.

IV. LONG ANSWER TYPE QUESTIONS CARRYING 5 MARKS EACH

28. In brief state what happens when:
    i) Dry apricots are left for some time in pure water and later transferred to sugar solution?
    ii) A red blood cell is kept in concentrated saline solution?
    iii) The plasma membrane of a cell breaks down?
    iv) Rheo leaves are boiled in water first and then a drop of sugar syrup is put on it?
    v) Golgi apparatus is removed from the cell?
29. Explain in detail what do you know about the structure of the nucleus.
30. Distinguish between hypotonic solution, isotonic solution and hypertonic solution.
31. Illustrate a plant cell as seen under electron microscope. How is it different from animal cell?

V Board based questions:

32. Name two cell organelles having double membrane envelope.
33. Name the cell organelle which you would associate with elimination of old and worn out cells.
34. How does endocytosis help an organism like amoeba?
35. Grass looks green, papaya appears yellow. Which is the cell organelle responsible for this? Write the structural features of this organelle.

ANSWERS

<table>
<tr><td>1</td><td>Lipids, proteins</td></tr>
<tr><td>2.</td><td>Cell wall, plastids</td></tr>
<tr><td>3.</td><td>Nucleolus</td></tr>
<tr><td>4.</td><td>ATP</td></tr>
<tr><td>5.</td><td>Leucoplasts</td></tr>
<tr><td>6.</td><td>c) Lysosomes as they have digestive enzymes to breakdown foreign material.</td></tr>
<tr><td>7.</td><td>b) The concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell.</td></tr>
<tr><td>8.</td><td>c) Cytoplasm- Q, nucleus- R, plasma membrane- S and P</td></tr>
<tr><td>9.</td><td>c) bacteria</td></tr>
<tr><td>10.</td><td>d) All living things are made of cells that look different from each other.</td></tr>
<tr><td>11.</td><td>(i)Both A and R are true and R is the correct explanation of the assertion.</td></tr>
<tr><td>12.</td><td>(ii)Both A and R are true but R is not the correct explanation of the assertion.</td></tr>
<tr><td>13.</td><td>(iii)A is true but R is false.</td></tr>
<tr><td>14</td><td>i) Prokaryotic cell</td></tr>
<tr><td></td><td>ii) Presence or absence of membrane bound organelles.</td></tr>
<tr><td></td><td>iii) Q</td></tr>
<tr><td></td><td>iv) Nuclear material of the bacterial cell is not enclosed in a nuclear envelope as in case of an animal cell.</td></tr>
<tr><td>15.</td><td>The pores present on the nuclear membrane allow transport of water-soluble molecules across the nuclear envelope. RNA and ribosomes move out of the nucleus, whereas carbohydrates, lipids and proteins move into the nucleus.</td></tr>
<tr><td>16.</td><td>Similarities
(a) Both are double membrane structures.
(b) Both of them have their own genetic material.
<table>
<tr><th colspan="2">Difference Between Mitochondria and Plastids</th></tr>
<tr><th>Mitochondria</th><th>Plastids</th></tr>
<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>
<tr><td>Pigments are absent</td><td>Pigments are present</td></tr>
</table></td></tr>
<tr><td>17.</td><td>When a living plant cell loses water through osmosis (in hypertonic solution) there is shrinkage or contraction of the contents of the cell away from the cell wall. Such a cell is said to be plamolysed cell and the phenomenon is known as plasmolysis.
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.</td></tr>
<tr><td>18.</td><td>A bacterial cell is a prokaryotic cell which contains a poorly defined region called nucleoid. All the membrane-bound cell organelles are absent in a bacterial cell.
An onion peel cell is a eukaryotic plant cell which contains a well-defined nucleus and all the membrane-bound cell organelles such as mitochondria, ER, etc.</td></tr>
</table>

19. It packages material synthesised in the ER and dispatches it to intracellular (plasma membrane and lysosomes) and extracellular (cell surface) targets.

20. Lysosomes are called the digestive bags of the cell because they contain powerful digestive enzymes, which are capable of digesting the very own cell in which they are present.

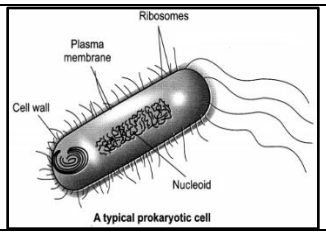
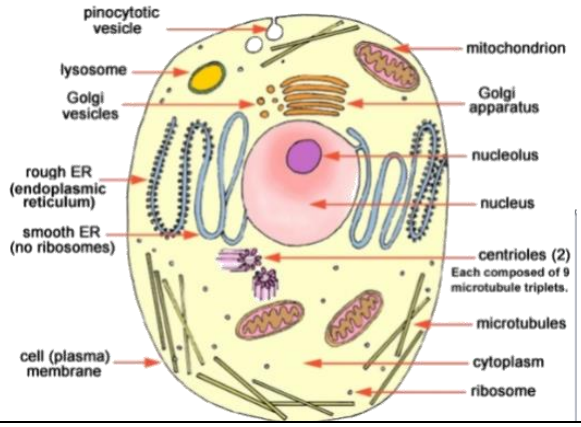
21.

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 termed as membrane biogenesis.

22.

Basis of Comparison	**Diffusion**	**Osmosis**
Meaning	It refers to the movement of molecules from a region of higher concentration to the lower one.	It is the movement of a solvent (mostly water) from the region of higher concentration to lower concentration
Medium	It takes place In any medium of solid, liquid or gas	It takes place only in a liquid medium
Semi-permeable 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

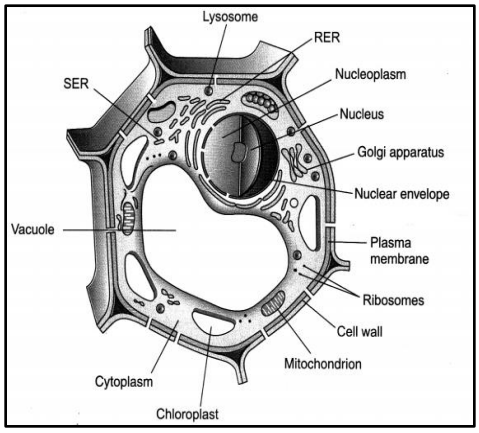
23.	
24.	The functions are:- (i) Inner membrane of mitochondria is deeply folded and these folds create large surface area for ATP generation. (ii) Nucleus of the cell is the control centre of the cell as it controls all the activities of the cell, plays a central role in cellular reproduction and contains DNA which helps to transfer the genetic information from parents to their offsprings. (iii) Ribosomes present in active cells are the sites for protein synthesis.
25.	1. Cell membrane is present in all cells while cell wall is only present in plants, bacteria, fungi and algae. 2. Cell wall is made up of cellulose whereas cell membrane is made up of lipids and proteins. 3. Cell wall is non-living whereas cell membrane is living.
26.	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 colored plastid. 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 chemical energy of food. **Functions of plastids are as follows -** **Chloroplast** helps in photosynthesis. Chloroplast also contain various yellow or orange pigments in addition to chlorophyll. These coloured plastids imparts 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.
27.	

28. i) The apricots swell due to osmosis initially and when transferred to sugar solution shrink again due to exosmosis.
ii) RBCs shrink due to exosmosis.
iii) It would lead to scattering of cell organelles and there will be no functioning of the organelles.
iv) There will be no change in cell shape or size because the cells are dead due to boiling.
v) Function of Golgi apparatus is packing, storing and transfer of protein. It would affect the functioning of cell.

29. The nucleus has a double layered covering called nuclear membrane. The nuclear membrane has pores which allow the transfer of material from inside the nucleus to its outside, that is, to the cytoplasm.
The nucleus contains chromosomes, which are visible as rod-shaped structures only when the cell is about to divide. Chromosomes contain information for inheritance of features from parents to next generation in the form of DNA (Deoxyribo Nucleic Acid). DNA molecules contain the information necessary for constructing and organising cells. Functional segments of DNA are called genes.
In a cell which is not dividing, this DNA is present as part of chromatin material. Chromatin material is visible as entangled mass of thread like structures. Whenever the cell is about to divide, the chromatin material gets organised into chromosomes.
The nucleolus is almost spherical structure found inside the nucleus. It contains RNA (ribonucleic acid) and proteins which help in protein synthesis in the cytoplasm.

30.

Hypotonic solution	**Isotonic solution**	**Hypertonic 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.**	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**.	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**.

31. 

		Plant cell	**Animal wall**
		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.
32.	Nucleus, mitochondria (1m)		
33.	Lysosomes (1m)		
34.	It helps amoeba in engulfing food particles with help of pseudopodia. (2m)		
35.	Plastids - Chromoplasts – chloroplast (3m) Structure:-Each chloroplast has a double membrane. The inner matrix called stroma has flattened stack of thylakoids called grana. Chloroplast have their own DNA and ribosomes		

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