

المدرسة  
الوطنية الأرثوذكسية  
الشميساني



The National  
Orthodox School  
Shmaisani

Stage (9 - 12)  
1<sup>st</sup> Semester | 2023-2024

Subject: Biology

Name : .....

Answer Key.

# Chapter 1 : Cells

## Practice Booklet

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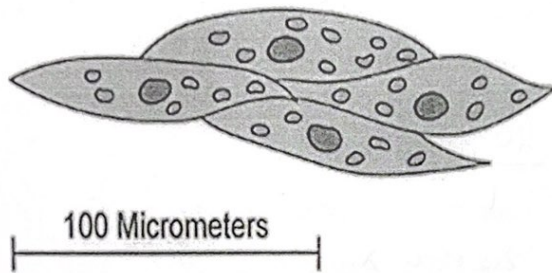
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مُعْتَمَدٌ مِنْ

**Topic 1 : Cell Structure and function**

**Question 1 :**

The figure below shows some muscle cells which contain many mitochondria.



**Key:**

● = Nucleus

○ = Mitochondrion

**Figure 3**

Give a reason why muscle cells contain many mitochondria.

Muscle cells need more energy released by respiration which takes place in the mitochondria.

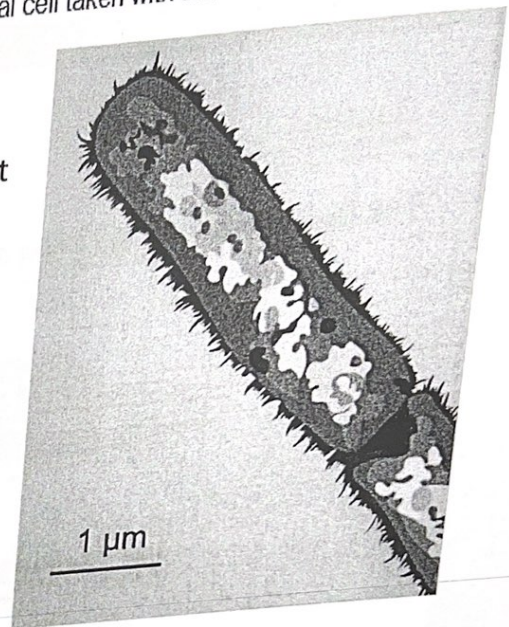
### Question 2 :

The figure below shows an image of a bacterial cell taken with an electron microscope.

The width of the bacterial cell is estimated at 1  $\mu\text{m}$ . The bacterial cell is 2 cm wide in the image .

Calculate the magnification of the image .

$$M = \frac{I}{A} = \frac{20000}{1} \\ = 20\,000 \times$$



### Question 3 :

Describe one type of cell which is atypical to the concept of cell theory.

“Choose one of the 3 discrepancies.....”

and explain.”

for example: Striated muscle fibres :

larger than most animal cells and have many nuclei.

**Question 4 :**

The table shows information about the magnification of a light microscope.

| Magnification of eyepiece lens | Magnification of objective lens | Total magnification |
|--------------------------------|---------------------------------|---------------------|
| 10 x                           | 4 X                             | 40 x                |
| 10 x                           | 10 x                            | 100 X               |
| 10 x                           | 40 x                            | 400 X               |

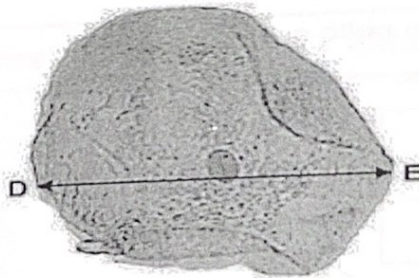
Complete the empty cells in the table .

**Question 5 :**

The cheek cell in **Figure 2** is magnified 250 times.

The width of the cell is shown by the line **D** to **E**.

**Figure 2**



Calculate the width of the cheek cell in micrometres ( $\mu\text{m}$ ).

Complete the following steps.

Measure the width of the cell using a ruler

5.3 cm  $\Rightarrow$  53 mm .  
..... mm

Use the equation to work out the real width of the cell in mm:

$$\text{real size} = \frac{\text{image size}}{\text{magnification}} = \frac{53}{250} =$$

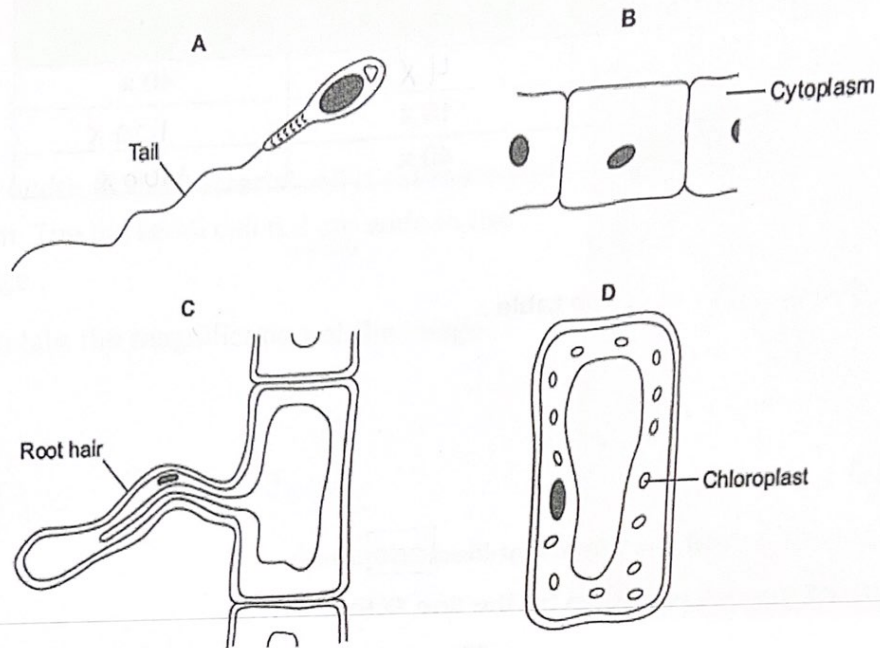
0.212 ..... mm

Convert mm to  $\mu\text{m}$

21.2 .....  $\mu\text{m}$

### Question 6 :

The diagrams show four types of cell, A, B, C and D.  
Two of the cells are plant cells and two are animal cells.



Which two of the cells are plant cells?

Tick (✓) one box.

A and B

A and D

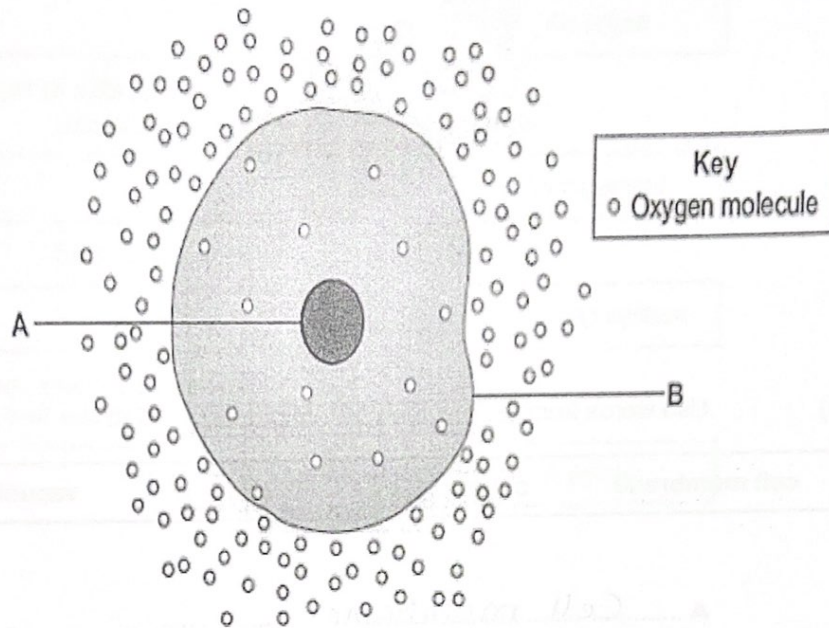
C and D

Give one reason for your answer.

..... Both cells have cell wall.....

**Question 7 :**

The diagram shows a cell.



(a) (i) Use words from the box to name the structures labelled A and B .

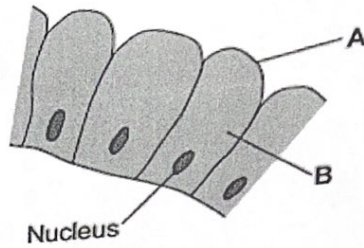
cell membrane    chloroplast    cytoplasm    nucleus

A ..... Nucleus .....

B ..... Cell membrane .....

**Question 8 :**

The image below shows some cells in the lining of the stomach.



(a) Use words from the box to name structures A and B.

- |               |             |           |         |
|---------------|-------------|-----------|---------|
| cell membrane | chloroplast | cytoplasm | vacuole |
|---------------|-------------|-----------|---------|

A ..... Cell membrane .....  
B ..... Cytoplasm .....

What is the function of the nucleus?

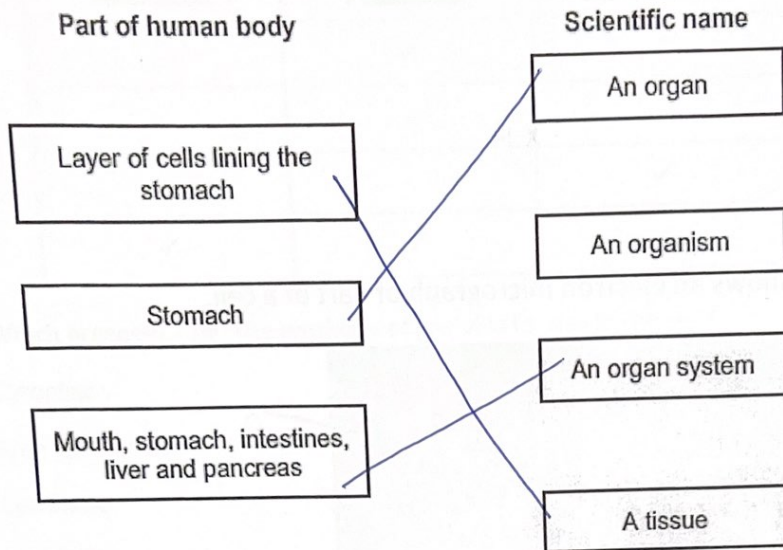
Tick (✓) one box.

To control the activities of the cell

To control movement of substances into and out of the cell

To release energy in respiration

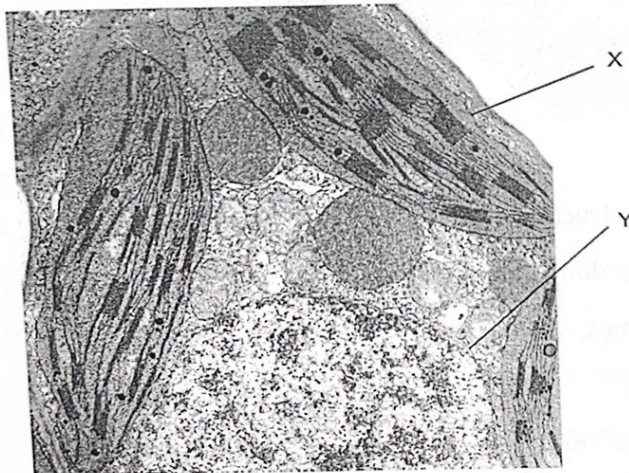
(b) Draw one line from each part of the human body to its correct scientific name



**Question 9 :**

Circle the correct answer :

1. The electron micrograph shows a section through a cell.

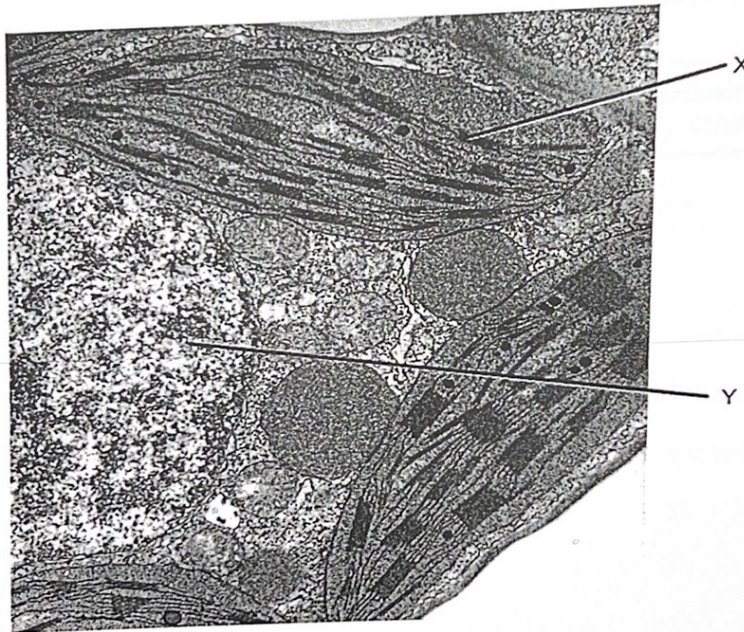




What is the name of the cell component labelled Y?

- A. Golgi apparatus
- B. Nucleus
- C. Cytoplasm
- D. Vacuole

2. The image shows an electron micrograph of part of a cell.



Which features do the two structures labelled X and Y have in common?

- A. They are surrounded by a double membrane.
- B. They contain 70S ribosomes.
- C. They contain naked DNA.
- D. They are only found in leaf cells.

3. Where could genes be located in a prokaryotic cell?

|           | Nucleoid | Plasmids | Ribosomes |
|-----------|----------|----------|-----------|
| A.        |          | ✓        | ✓         |
| <b>B.</b> | ✓        | ✓        |           |
| C.        | ✓        |          | ✓         |
| D.        | ✓        | ✓        | ✓         |

4. Which organelle does the synthesis of proteins for use in the cell?

- A. Cytoplasm
- B. Free Ribosomes**
- C. Lysosomes
- D. Centrioles

5. Which is the best description of the function of Mitochondria?

- A. Assemble microtubules for the spindle in mitosis.
- B. Synthesis of proteins for use outside the cell.
- C. The site of Aerobic respiration - the production of ATP**
- D. Synthesis of proteins for use in the cell.

6. In which organelles does synthesis of proteins for use outside the cell take place?

- A. Golgi Apparatus
- B. Plasma Membrane
- C. Centrioles
- D. Rough Endoplasmic Reticulum (rER)**

7. Which of the following organelles are surrounded by a single membrane?

- I Ribosome
- II Rough endoplasmic reticulum
- III Chloroplast

IV Lysosome

A. I and III only

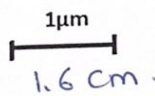
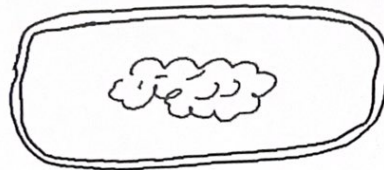
B. II and IV only

C. I and II only

D. I, II and IV only

**Question 10 :**

Calculate the length of this prokaryote cell using the scale bar.  
(2 marks)



$$M = \frac{I}{A} = \frac{1.6 \text{ cm}}{1 \mu\text{m}} = 16000 \times$$

$$A = \frac{I}{M} = \frac{5.7 \text{ cm}}{16000} = \frac{57000 \mu\text{m}}{16000} = 3.56 \mu\text{m}$$

Compare the structure of a prokaryote cell with an eukaryote cell (4 marks)

| <u>prokaryotes</u>            | <u>Eukaryotes</u>              |
|-------------------------------|--------------------------------|
| • No nucleus                  | • Nucleus                      |
| • Cell wall has peptidoglycan | • Cell wall has cellulose      |
| • Unicellular                 | • Unicellular or multicellular |
| • Simple structure            | • Complex structure            |
|                               |                                |
|                               |                                |

### Question 11:

Eukaryote cells contain organelles which each have specific functions. Complete the table below, to identify the missing organelle names and the missing functions.

| Organelle           | Structure  | Function   |
|---------------------|--|--|
| Nucleus             | Large structure surrounded by a double membrane with DNA and proteins inside.  | Contains the cell's DNA and is the site of DNA replication |
| Golgi apparatus     | A stack of four or more flattened membrane disks   | <u>Packaging and modifying proteins</u>                    |
| <u>Lysosome</u>     | A round organelle with a single membrane containing digestive enzymes.   | Digestion of molecular debris inside the cell.             |
| <u>Mitochondria</u> | An organelle with a double membrane. The outer membrane makes the shape of the organelle but the inner membrane folds into cristae | <u>The site of aerobic respiration</u>                     |

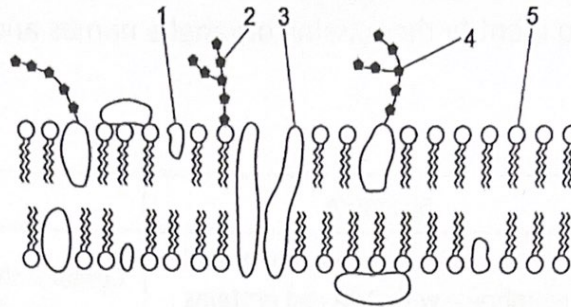
## Topic 2 : Cell membrane

Question 1 : Circle the correct answer .

1. Plasma membrane is best described as....

- A. A phospholipid bilayer that surrounds the cell
- B. Organelles made of protein and RNA that direct protein synthesis.
- C. A rigid non-cellulose structure that surrounds cells of bacteria
- D. A dense region of DNA in a prokaryotic cell.

Which row correctly labels this diagram of a cell surface membrane?



|           | Cholesterol | Glycoprotein | Glycolipid | Protein | Phospholipid |
|-----------|-------------|--------------|------------|---------|--------------|
| A.        | 3           | 2            | 4          | 1       | 5            |
| B.        | 5           | 3            | 2          | 4       | 1            |
| <b>C.</b> | 1           | 4            | 2          | 3       | 5            |
| D.        | 5           | 2            | 4          | 3       | 1            |

What is the main function of cholesterol in the cell surface membrane?

- A. To provide hydrophilic channels.
- B.** To regulate membrane fluidity.
- C. To assist active transport.
- D. To assist cell adhesion.

Which of the following correctly describes the model of membrane structure that is now widely accepted?

- A.** A phospholipid bilayer with a series of proteins that are free to move around within the membrane.
- B. A phospholipid bilayer.
- C. A phospholipid bilayer with a layer of protein on either side.
- D. A phospholipid bilayer with a series of proteins in fixed positions throughout.

Question 2 :

a. Define the following terms:

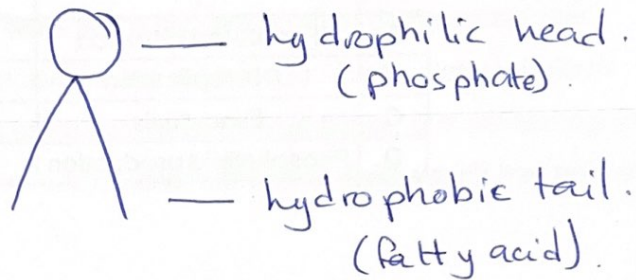
(i) hydrophilic

..... Substances attracted to water .....

(ii) hydrophobic

..... Substances not attracted / repelled by water .....

b. Draw a labelled diagram of a phospholipid molecule.



c. State the property of phospholipids that causes them to form bilayers when placed in water.

..... Hydrophilic head and hydrophobic tail .....

..... (amphiphathic) .....

d. State the functions of cholesterol in animal membranes.

..... ① Regulates fluidity .....

..... ② Regulates permeability .....