Unit 1 · Cell Biology

WORKSHEET

Full marks 42

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 42

1 Key words [4]

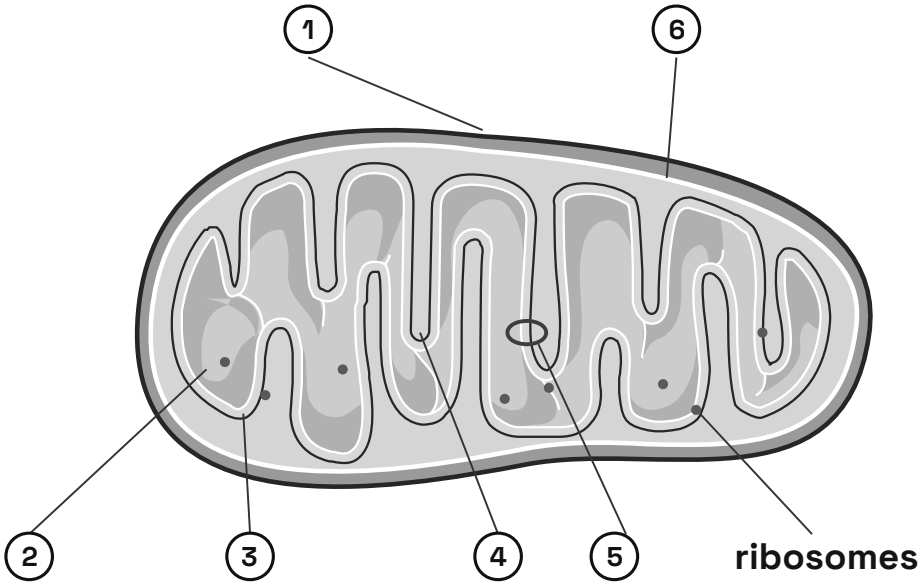
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

cellulose	**chitin**	**cristae**	**fluid mosaic**	**grana**	**nucleoid**	**nucleolus**	**peptidoglycan**
stroma	**tonoplast**						

A prokaryotic cell keeps its DNA in a region called the _____, with no membrane round it. The cell wall of a bacterium is made of _____, while that of a plant cell is mainly _____. The cell membrane is described by the _____ model. The folds of the inner membrane of a mitochondrion are called _____. The stacks of thylakoids in a chloroplast are called _____, and the fluid round them is the _____. The dense, round body in the nucleus that makes the parts of ribosomes is the _____.

2 Label the diagram [3]

The diagram shows a mitochondrion cut lengthwise. Name the parts numbered 1 to 6. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____ **4.** _____

5. _____ **6.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. The cell wall of a bacterium is made of: [1]

a. cellulose **b.** chitin
c. peptidoglycan **d.** pectin

ii. Which of these organisms is made of prokaryotic cells? [1]

a. *Amoeba* **b.** yeast
c. *Nostoc* **d.** *Spirogyra*

iii. The F_1 particles (oxysomes) that make ATP are found on the: [1]

a. outer membrane of the mitochondrion **b.** inner membrane of the mitochondrion
c. thylakoid membrane of the chloroplast **d.** nuclear envelope

iv. The cell plate in a dividing plant cell is formed by: [1]

a. the centrosome **b.** lysosomes
c. Golgi bodies **d.** the nucleolus

v. A centriole is made of: [1]

a. nine pairs of microtubules round two in the middle
b. nine triplets of microtubules round an empty middle
c. two triplets of microtubules
d. a stack of flattened sacs

4 Match the columns [3]

Match each part in Column A with its job in Column B. One job in Column B is not needed. Each carries 0.5 mark.

Column A		Column B
1. ribosome	☐	**a.** modifies, packs and sends out proteins
2. lysosome	☐	**b.** keeps a plant cell turgid
3. smooth ER	☐	**c.** digests worn-out parts of the cell
4. Golgi body	☐	**d.** stores starch in a potato
5. centrosome	☐	**e.** joins amino acids into proteins
6. vacuole	☐	**f.** forms the spindle in an animal cell
		g. makes lipids and steroid hormones

5 Very short answers [3]

Write very short answers to the following questions.

a. Write the total magnification of a microscope with a 10× eyepiece and a 40× objective. [1]

b. What are the three kinds of plastid, by color? **[1]**

c. Give the pattern of microtubules in (i) a centriole and (ii) a cilium. **[1]**

6 Short answers **[8]**

Write short answers to the following questions.

a. Give a reason: a plant cell doesn't burst when it is placed in pure water, but a red blood cell does. **[2]**

b. Give a reason: mitochondria and chloroplasts are called semi-autonomous organelles. **[2]**

c. Write any two differences between rough ER and smooth ER. **[2]**

d. A drug that jams 70S ribosomes kills bacteria. Why doesn't it stop the 80S ribosomes in our cytoplasm, and why can it still cause side effects in us? **[2]**

7 Long answer [4]

Write a long answer to the following question.

Trace the path of a digestive enzyme from the gene that codes for it to its secretion from a cell of the pancreas. Name each organelle and what it does.

8 Numerical problems [9]

Solve the following problems. Show your working.

a. In a photomicrograph at 400×, an onion peel cell is 120 mm long and 20 mm wide. Find its real length and width in micrometers. [2]

Answer:

b. In an electron micrograph magnified 25,000 times, a mitochondrion is 75 mm long. A nucleus 8 µm across is drawn 4 cm across in a textbook. [3]

i. Find the real length of the mitochondrion in micrometers.

ii. Find the magnification of the drawing of the nucleus.

Answer:

c. Find the ratio of surface area to volume for cube-shaped cells of sides 1 μm, 5 μm and 10 μm. What happens to the ratio as a cell gets bigger, and why does this limit a cell's size? **[4]**

Answer: _____

9 Think **[3]**

The cells of three tissues are described to you: one is packed with rough ER and Golgi bodies; one has many chloroplasts and a large vacuole; one has a large vacuole, many leucoplasts full of starch and no chloroplasts. Which is which, and how do their parts fit their jobs?

10 Activity: Beetroot, when the membrane dies (not marked)

Cut two cubes of beetroot about 1 cm across and rinse them until the water runs clear. Put one in cold water and the other in hot water (an adult should pour it). After 10 minutes, compare the water in the two glasses and fill in the table.

Glass	My guess: what color?	What I found	Why?
cold water			
hot water			

Which part of the cell held the pigment in, the wall or the membrane? How do you know?