

Cell Structure and Function

Mark Scheme



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1. The following questions explore aspects of cell structure, function, and processes. Answer each part by selecting the correct answer from the options.

- a) The figure below shows two guard cells in the lower epidermis of a plant leaf.
Which label, A, B, C or D shows the **cell wall**? Circle the letter of the correct answer.

D – is the only correct answer.	1 mark
	Total: 1 mark

- b) Root hair cells are located on plant roots.
Which feature from the options below is found in a root hair cell but **not** in a sperm cell.
Circle the letter of the correct answer.

A – is the only correct answer.	1 mark
	Total: 1 mark

- c) The figure below shows some kidney cells as they appear under a microscope.
How many **cell walls** are visible? Circle the letter of the correct answer.

B – is the only correct answer.	1 mark
	Total: 1 mark

- d) The figure below shows a typical plant cell. In which labelled part is glucose made?
Circle the letter of the correct answer.

C – is the only correct answer.	1 mark
	Total: 1 mark

(Total for Question 1 is 4 marks)

2. The figure below shows a typical animal cell.

a) Identify the parts labelled S, P, Q and R.

S = Cell membrane	1 mark
P = Cytoplasm	1 mark
Q = Mitochondrion	1 mark
R = Nucleus	1 mark
	Total: 4 marks

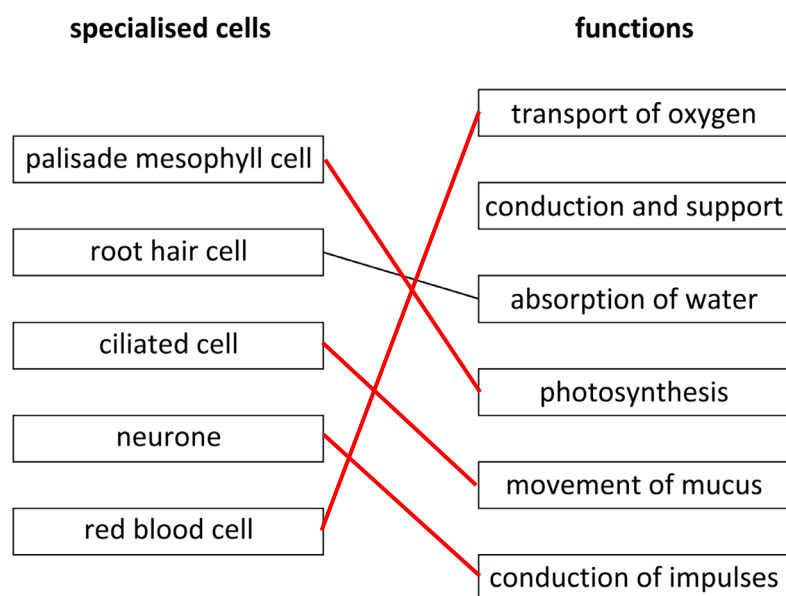
b) Identify **two** structures that would be present in plant cells but that are absent from animal cells.

A response that identifies any two of the following:	
- Cell wall. - Chloroplast. - Vacuole.	2 marks
	Total: 2 marks

c) Identify **two** structures that are present in bacterial cells but would be absent from animal cells.

A response that identifies any two of the following:	
- Cell wall. - Plasmid. - Pilus/ pili. - Nucleoid DNA/ free DNA.	2 marks
	Total: 2 marks

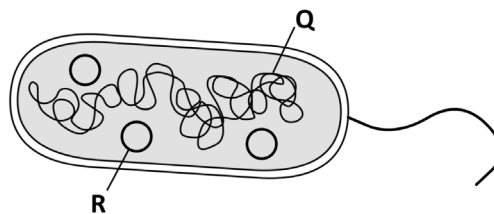
d) Cells can be specialised to perform a specific function in the body. Complete the activity below by drawing four lines to match the specialised cell to its function. One line has been drawn for you.



1 correct match scores 0 marks	
2 correct matches scores 1 mark	
4 correct matches scores 2 marks	
	Total: 2 marks

(Total for Question 2 is 10 marks)

3. The figure below shows a typical bacterial cell.



a) Identify the parts labelled Q and R in the figure.

Q = Nucleoid DNA/ Free DNA.	1 mark
R = Plasmid.	1 mark
	Total: 2 marks

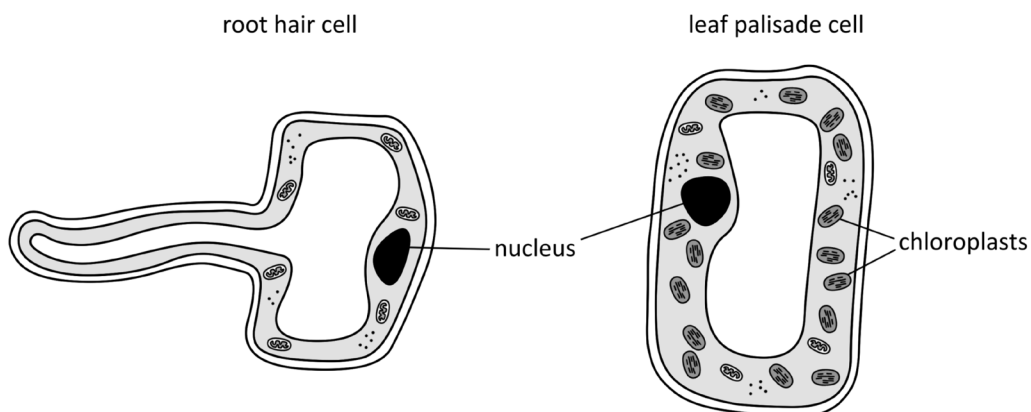
b) Bacterial cells have cell walls to provide the cell with structure and support.

What **substance** is used to form bacterial cell walls?

An answer that correctly references the following:	
<u>Peptidoglycan.</u>	1 mark
	Total: 1 mark

(Total for Question 3 is 3 marks)

4. The diagrams show two cells taken from a plant.



a) Root hair cells take up water by which process?

Circle the letter of the correct answer.

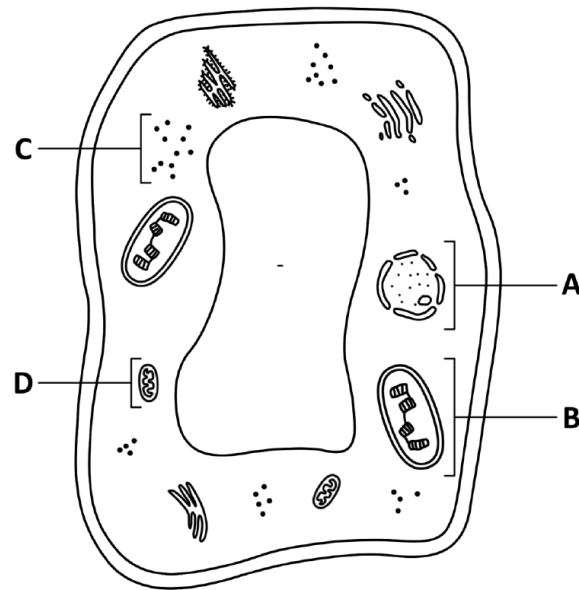
D – is the only correct answer.	1 mark
	Total: 1 mark

b) Describe the function of the chloroplasts in a leaf cell.

A description to include the following:	
Chloroplasts are the <u>site of photosynthesis</u> .	1 mark
Light energy is used to convert carbon dioxide and water into glucose and oxygen.	1 mark
Accept:	
- Where light energy is trapped to make food for the plant. - Contains chlorophyll which absorbs light energy for photosynthesis.	
	Total: 2 marks

(Total for Question 4 is 3 marks)

5. A biologist was using an electron microscope to study plant cells. The figure below shows the plant cell the biologist was studying.



- a) Identify the cell structures labelled A and B.

A = Nucleus.	1 mark
B = Chloroplast.	1 mark
	Total: 2 marks

- b) State the functions of the structures labelled C and D.

C are ribosomes which are the site of <u>protein synthesis</u> .	1 mark
D is a mitochondrion which is the site of <u>aerobic</u> respiration.	1 mark
	Total: 2 marks

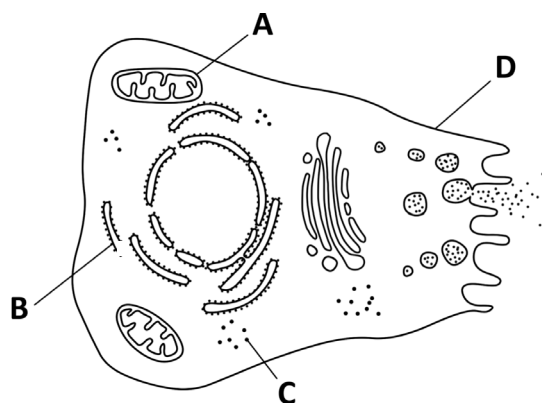
- c) The cell in the figure above is a eukaryote.

Describe **two** differences between a eukaryotic and prokaryotic cell?

A description to include any two of the following:	
A eukaryotic cell has: • A nucleus. • Organelles. • Accept any named organelles for example mitochondria or chloroplasts.	2 marks
Allow converse statements.	
	Total: 2 marks

(Total for Question 5 is 6 marks)

6. The figure below shows the structure of an animal cell.



a) Identify the cell structures labelled A, B, C and D.

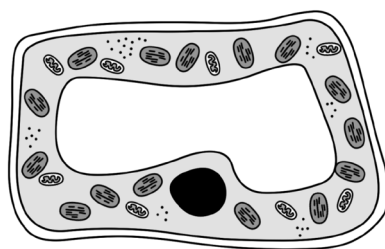
A = Mitochondrion.	1 mark
B = Cytoplasm.	1 mark
C = Ribosomes.	1 mark
D = Cell membrane.	1 mark
Total: 4 marks	

b) State the functions of the structures labelled A, B, C and D.

Statements which <u>link</u> the following structures with their functions:	
Mitochondrion – site of <u>aerobic</u> respiration.	1 mark
Marking note: aerobic must be given for the mark.	
Cytoplasm – is the site of the metabolic chemical reactions.	1 mark
Accept site of chemical reactions.	
Ribosomes – site of protein synthesis.	1 mark
Cell membrane – controls what enters and leaves the cells as it is partially permeable.	1 mark
Total: 4 marks	

(Total for Question 6 is 8 marks)

7. The diagram shows a cell from the leaf of a plant.



Describe the role of **each** of the structures in this plant cell.

Marking guidance		
Level	Marks	Descriptor
Level 1	1 - 2	There is a limited attempt to describe the role of the organelles in a plant cell. Between one and three organelles are described correctly.
Level 2	3 - 4	Between four and six organelles are described correctly.
Level 3	5 - 6	Between seven and eight organelles are described correctly.

Description to include the following:	
Nucleus – contains the cell's DNA, which controls the cell's activities.	
Cytoplasm – is a jelly-like material that contains dissolved nutrients and salts and structures called organelles. It is where many of the metabolic chemical reactions take place.	
Cell membrane – is partially permeable to substances and so controls the movement of substances in and out of the cell.	
Vacuole – stores cell sap and water within the cell. It is involved in keeping the cell flaccid (normal size).	
Chloroplast – an organelle that contains the green pigment, chlorophyll, which absorbs light energy for photosynthesis. Is the site of photosynthesis.	
Mitochondria – site of aerobic respiration.	
Ribosomes – the site of protein synthesis, where proteins are made.	
Cell wall – provides structure and support to the cell. Only plant cells have walls that are made from cellulose.	
	Total: 6 marks

(Total for Question 7 is 6 marks)

8. The figure below shows a eukaryotic cell.
The structures A and B are found in the leaf cells of a plant.

- a) Identify the cell structures labelled A and B.

A = Chloroplast.	1 mark
B = Mitochondrion.	1 mark
	Total: 2 marks

- b) Give the function of structure B.

Mitochondria – site of aerobic respiration.	1 mark
	Total: 1 mark

- c) Describe how a prokaryotic cell would differ from the cell in the figure above.

A description to include the following:	
A prokaryotic cell would not have:	
A nucleus. Organelles. Accept any example of a named organelle.	
Allow converse statements about eukaryotic cells.	
	Total: 2 marks

- d) Give an example of a prokaryotic cell.

Any bacterial cell.	1 mark
	Total: 1 mark

(Total for Question 8 is 6 marks)

9. The figure below shows a number of typical fungal cells.

- a) In terms of **cells walls**, describe the difference between a typical fungal cell and a typical bacterial cell.

A description to include:	
<u>Fungal cells</u> have cell walls made of <u>Chitin</u>.	1 mark
<u>Bacterial cells</u> have walls made of <u>peptidoglycan</u>.	1 mark
	Total: 2 marks

- b) Fungal cells are capable of both aerobic and anaerobic respiration.
Which organelle in a fungal cell is the site of aerobic respiration?

Mitochondria are the site of aerobic respiration.	1 mark
	Total: 1 mark

- c) Fungal cells contain permanent vacuoles.
What is the function of these permanent vacuoles?

Vacuole – stores cell sap and water within the cell.	1 mark
	Total: 1 mark

(Total for Question 9 is 4 marks)