Past-paper walk-through

Cell structure ▪ 2.1

eXercise

Questions in this set

- 0610/21 N25 Q3 ▪ 1 mark
- 0610/22 N25 Q4 ▪ 1 mark
- 0610/23 N25 Q3 ▪ 1 mark
- 0610/41 N25 Q1 ▪ 12 marks
- 0610/21 J25 Q3 ▪ 1 mark
- 0610/23 J25 Q2 ▪ 1 mark
- 0610/42 J25 Q5 ▪ 11 marks
- 0610/22 M25 Q3 ▪ 1 mark

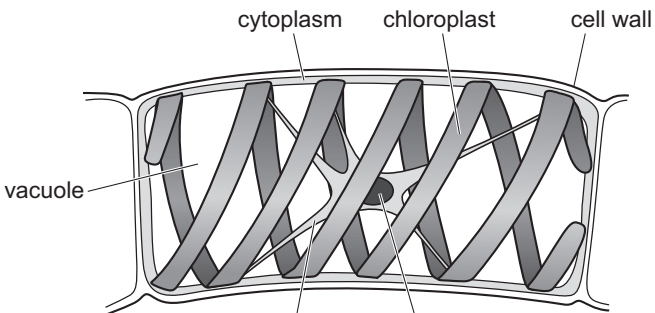
Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- // separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = "or words to that effect" – the wording need not match.

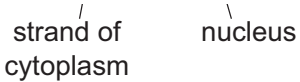
Question 3

0610/21 N25 ▪ Q3 ▪ 1 mark

3 The diagram shows a single cell from an organism called *Spirogyra*.



Question 3



Which features does *Spirogyra* share with plant cells?

	cell wall	chloroplast	cytoplasm	nucleus	vacuole
A	yes	yes	yes	yes	yes
B	yes	yes	no	no	yes
C	yes	no	yes	yes	no
D	no	yes	yes	no	yes

Solution 3

Answer: **A**

Why

- Spirogyra has a cell wall, chloroplasts, a vacuole and a nucleus.
- Those are all plant cell features – chloroplasts and a cell wall in particular.
- So it shares the plant cell's full set of structures.

Question 4

0610/22 N25 ▪ Q4 ▪ 1 mark

4 Which term describes each structure?

	structure		
	brain	liver	neurone
A	organ	organ	cell
B	organ	tissue	cell

C	tissue	organ	tissue
D	tissue	cell	organ

Solution 4

Answer: **A**

Why

- A cell is the basic unit; a tissue is a group of similar cells; an organ is several tissues working together.
- The brain and the liver are both organs.
- A neurone is a single cell.

Question 3

0610/23 N25 ▪ Q3 ▪ 1 mark

3 A palisade cell and a neurone are observed under a light microscope.

Which cell component is found only in the palisade cell?

A cell membrane

B cell wall

C cytoplasm

D nucleus

Solution 3

Answer: **B**

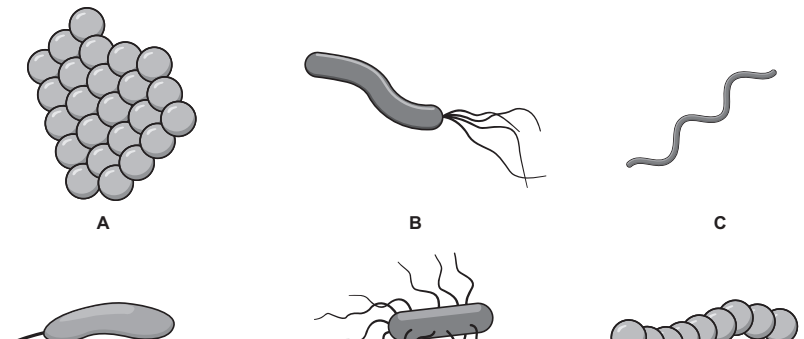
Why

- A palisade cell is a plant cell, so it has a cellulose cell wall.
- A neurone is an animal cell, which has no cell wall.
- Membranes, cytoplasm and nuclei are present in both.

Question 1

0610/41 N25 ▪ Q1 ▪ 12 marks

1 **(a)** Fig. 1.1 shows drawings of seven species of bacteria.

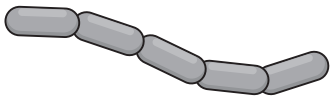


Question 1

D

E

F



G

not to scale

Fig. 1.1

Use the key to identify each species of bacteria in Fig. 1.1.

Write the letter of each species (**A** to **G**) in the correct box beside the key.

Question 1

One has been done for you.

key

1	(a)	hair-like structure or structures visible	go to 2	
	(b)	no hair-like structures visible	go to 4	
2	(a)	more than one hair-like structure	go to 3	
	(b)	one hair-like structure only	*Vibrio cholerae*	
3	(a)	hair-like structures attached at one end only	*Helicobacter pylori*	
	(b)	hair-like structures attached all over	*Salmonella typhi*	
4	(a)	bacteria have a spiral shape	*Treponema pallidum*	
	(b)	bacteria do **not** have a spiral shape	go to 5	
5	(a)	bacteria are grouped to form a chain	go to 6	

Question 1

	(b)	bacteria do **not** form a chain	*Staphylococcus aureus*	
6	(a)	bacteria in the chain are cylindrical in shape	*Streptobacillus moniliformis*	
	(b)	bacteria in the chain are circular in shape	*Streptococcus pyogenes*	**F**

[3]

(b) **(i)** A cylinder-shaped bacterium has a length of 2 μm and a diameter of 0.5 μm.

Calculate:

- the radius of this bacterium
- the volume of this bacterium.

Include the units in your answers.

Space for working.

Question 1

Question 1

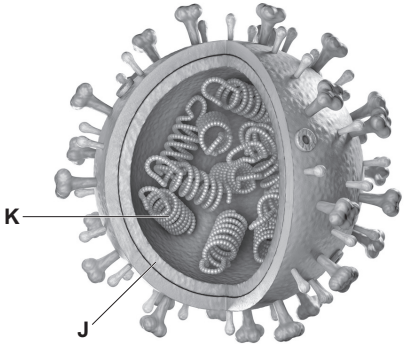
Question 1

[4]

(ii) State the name of the kingdom that bacteria belong to.

Question 1

(c) Fig. 1.2 is a diagram of a virus.



Question 1

Question 1

Fig. 1.2

(i) State the name of the parts labelled **J** and **K** in Fig. 1.2.

Question 1

Question 1

[2]

(ii) State **two** structures present in bacteria that are absent in viruses.

Question 1

Question 1

[2]

[Total:12]

Solution 1

(a) Mark scheme

- go to 2
- go to 4
- go to 3
- Vibrio cholerae
- D
- Helicobacter pylori
- B
- Salmonella typhi

Solution 1

- E
- Treponema pallidum
- C
- go to 5
- go to 6
- Staphylococcus aureus
- A
- Streptobacillus moniliformis
- G
- Streptococcus pyogenes

Solution 1

- F
- ;;;
- 3 6 correct = 3
- 3 or 4 or 5 correct = 2
- 1 or 2 correct = 1

Solution 1

(b)(i) Mark scheme

- radius: 0.25 um ;
- volume: 0.39 um3 ;;;
- 4 MP1 correct radius calculated
- MP2 correct formula r2h selected
- MP3 correct volume calculated
- MP4 correct units for both values
- ecf from previous MP

Solution 1

(b)(ii)

Mark scheme

- prokaryote ;
- 1

Solution 1

(c)(i)

Mark scheme

- J protein coat ;
- K genetic material ;
- 2
- 0610/41
- October/November 2025
- Guidance

Solution 1

(c)(ii) Mark scheme

- any two from:
- cell wall ;
- cell membrane ;
- circular / loop of, DNA ;
- plasmid ;
- cytoplasm ;
- ribosome ;
- AVP ;;

Solution 1

- 2
- e.g. flagella
- Guidance

Question 3

0610/21 J25 ▪ Q3 ▪ 1 mark

3 Which structures are found in both plant and animal cells?

A cell walls and cell membranes

B nuclei and cell walls

C cytoplasm and chloroplasts

D cell membranes and nuclei

Solution 3

Answer: **D**

Why

- Cell membranes and nuclei are found in both plant and animal cells.
- Cell walls and chloroplasts are found only in plant cells.
- So the shared pair is the cell membrane and the nucleus.

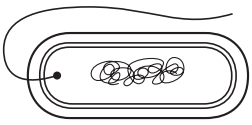
Question 2

0610/23 J25 ▪ Q2 ▪ 1 mark

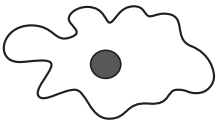
2 The diagrams show four organisms.

Which organism is a prokaryote?

A



B

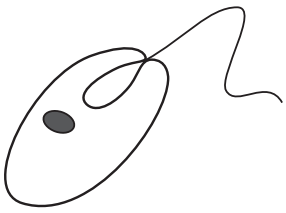


NOT TO SCALE

C

D

Question 2



Solution 2

Answer: **A**

Why

- A prokaryote has no nucleus and no membrane-bound organelles.
- Its DNA lies free in the cytoplasm, and it is much smaller than a eukaryotic cell.
- So pick the cell with no nucleus drawn in it.

Question 5

0610/42 J25 ▪ Q5 ▪ 11 marks

5 Fig. 5.1 is a diagram of a plant root hair cell.

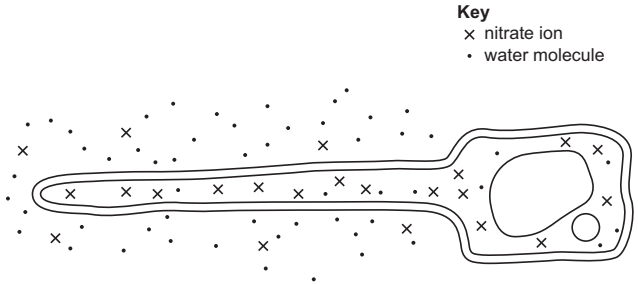


Fig. 5.1

Question 5

(a) **(i)** Using the information in Fig. 5.1, explain how nitrate ions are transported into the root hair cell.

Question 5

(ii) State **two** ways that nitrogen fixation occurs.

Question 5

Question 5

[1]

(b) State the name of the process that moves water molecules into root hair cells.

Question 5

(c) Describe differences **and** similarities between the structure of a plant root hair cell and a bacterial cell.

Question 5

[Total: 11]

Solution 5

(a)(i) Mark scheme

- any four from:
- 1
- active transport ;
- 2
- (movement of particles / nitrate ions) from a low concentration to a
- high concentration / against OR up the concentration gradient OR
- there are more (nitrate) ions in the cell / root hair than the soil ;
- 3

Solution 5

- pass, through / across, cell / partially permeable, membrane ;
- 4
- using protein, carriers / molecules ;
- 5
- using energy (from respiration) ;
- 4
- MP3 A root hair has a large surface area

Solution 5

(a)(ii)

Mark scheme

- lightning and (nitrogen fixing) bacteria ;
- 1

Solution 5

(b)

Mark scheme

- osmosis ;
- 1
- 0610/42
- May/June 2025
- Guidance

Solution 5

(c) Mark scheme

- total of five from:
- differences to max 3:
- root hair cells have:
- 1
- nucleus / nuclear membrane ;
- 2
- mitochondria ;
- 3

Solution 5

- (large permanent) vacuole ;
- 4
- cellulose cell wall / cell wall made of a different substance ;
- 5
- linear DNA ;
- 6
- no plasmids ;
- 7
- AVP ;
- similarities to max 3:

Solution 5

- 8
- cell wall ;
- 9
- cell membrane ;
- 10 cytoplasm ;
- 11 DNA / genetic material ;
- 12 ribosomes ;
- 13 AVP ;
- 5
- ora for the differences relating in context of

Solution 5

- bacteria
- MP2 A (correct named) membrane-bound
- organelles
- MP5 A circular / loop of, DNA
- 0610/42
- May/June 2025
- Guidance

Question 3

0610/22 M25 ▪ Q3 ▪ 1 mark

3 Which structures are found in both plant cells and bacterial cells?

	cell membrane	cell wall	plasmid	ribosomes
A	yes	yes	yes	no
B	no	yes	yes	yes
C	yes	no	yes	yes
D	yes	yes	no	yes

Solution 3

Answer: **D**

Why

- A plant cell has a membrane, a cell wall and ribosomes; so does a bacterial cell.
- Plasmids are found only in bacteria, never in plant cells.
- So the shared structures are the cell membrane, the cell wall and ribosomes.