

FREE SAMPLE: THE FIRST 3 QUESTIONS

PAPER 1

40 marks · Questions 1 – 40 · multiple choice (A – D) · 1 h

Answer ALL questions. For each question from 1 to 40, four options are given. One of them is the correct answer. Make your choice (A, B, C or D). Each question carries 1 mark. A scientific calculator may be used. Where a question asks for it, give numerical answers to 3 significant figures.

1. Which type of cell has cilia, so that it sweeps mucus and trapped bacteria up and away from the lungs? [1 mark]

- A Red blood cell
- B Ciliated cell lining the trachea
- C Guard cell
- D Palisade mesophyll cell

2. A cube of agar has sides of 3 cm. What is the ratio of its surface area to its volume? [1 mark]

- A 0.5 : 1
- B 18 : 1
- C 2 : 1
- D 1 : 1

3. A student draws a cell seen under the microscope. The drawing of the cell is 20 mm long. The actual length of the cell is 80 μm . What is the magnification of the drawing? [1 mark]

- A $\times 0.4$
- B $\times 500$
- C $\times 2500$
- D $\times 250$

THE WORKED ANSWERS TO THOSE 3 QUESTIONS

1. Which type of cell has cilia, so that it sweeps mucus and trapped bacteria up and away from the lungs? [1 mark] [Specialised cells]

Correct answer: B — Ciliated cell lining the trachea

- A cell that has cilia, so that it sweeps mucus and trapped bacteria up and away from the lungs is the ciliated cell lining the trachea.
- Why the other options are wrong:
- A (Red blood cell): The red blood cell has no nucleus and contains haemoglobin, so that it carries more oxygen.
- C (Guard cell): The guard cell can change shape to open and close the stoma, so that it controls gas exchange and water loss.
- D (Palisade mesophyll cell): The palisade mesophyll cell contains many chloroplasts, so that it absorbs a lot of light for photosynthesis.

LOS: Cells and the Chemistry of Life · Specialised cells

KEY TAKEAWAY

Specialised cells have structures that suit their function.

2. A cube of agar has sides of 3 cm. What is the ratio of its surface area to its volume? [1 mark] [Surface area to volume ratio]

Correct answer: C — 2 : 1

- Surface area = $6 \times 3 \times 3 = 54 \text{ cm}^2$.
- Volume = $3 \times 3 \times 3 = 27 \text{ cm}^3$.
- Ratio = $54 : 27 = 2 : 1$.
- Why the other options are wrong:

- A (0.5 : 1): the ratio was inverted
- B (18 : 1): the side length was multiplied instead of divided
- D (1 : 1): only three faces were counted

LOS: Cells and the Chemistry of Life · Surface area to volume ratio

KEY TAKEAWAY

Smaller cells and blocks have a larger surface area to volume ratio, so exchange is faster.

3. A student draws a cell seen under the microscope. The drawing of the cell is 20 mm long. The actual length of the cell is 80 μm . What is the magnification of the drawing? [1 mark]
[Magnification and size]

Correct answer: D — $\times 250$

- Convert the drawing length to μm : $20 \text{ mm} \times 1000 = 20\,000 \mu\text{m}$.
- Magnification = image size $\div$ actual size = $20\,000 \div 80 = 250$.
- Why the other options are wrong:
- A ($\times 0.4$): the actual size was divided by the image size
- B ($\times 500$): the magnification was not worked out from the lengths
- C ($\times 2500$): the units were not converted: $1 \text{ mm} = 1000 \mu\text{m}$

LOS: Cells and the Chemistry of Life · Magnification and size

KEY TAKEAWAY

Magnification = image size $\div$ actual size; convert to the same unit first ($1 \text{ mm} = 1000 \mu\text{m}$).

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