AQA Examination-style questions

1 (a) Describe osmosis in terms of water potential. *(3 marks)*

(b) In an experiment, cylinders cut from a potato were placed in sucrose solutions of different concentrations. The cylinders were measured before and after immersion in sucrose solution. **Figure 1** shows the effect of the sucrose solutions on the length of the potato cylinders.

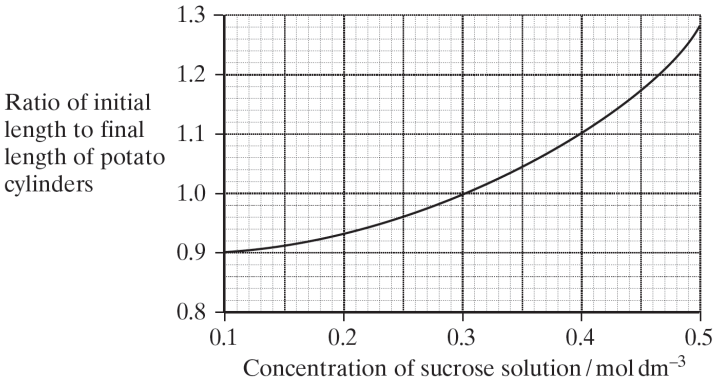

Figure 1

(i) The initial length of the potato cylinder in 0.1 mol dm^{-3} sucrose solution was 5.0 cm. Calculate the final length of this cylinder. Show your working.

(ii) On a copy of **Figure 1**:

1. mark with a **T** a point on the curve where the potato cells are turgid
2. mark with a **W** a point on the curve where the potato cells have the same water potential as the sucrose solution. *(3 marks)*

AQA, 2003

2 (a) **Figure 2** shows an electron micrograph of parts of epithelial cells from the small intestine.

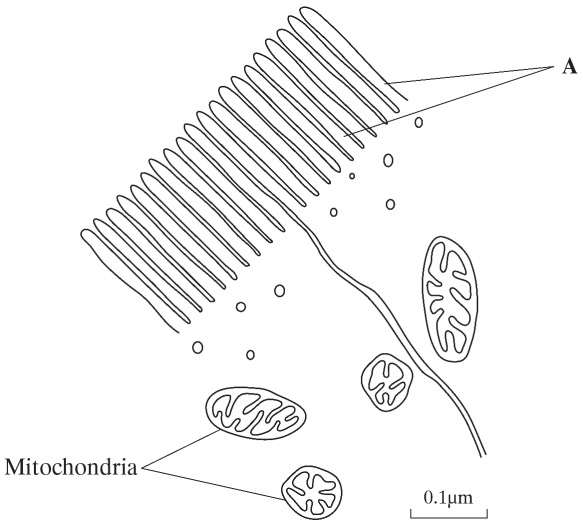

Figure 2

(i) Name the structures labelled **A**.

(ii) Explain how these structures help in the absorption of substances from the small intestine. *(2 marks)*

(b) (i) The scale bar on this drawing represents a length of 0.1 µm. Calculate the magnification of the drawing. Show your working.

(ii) Explain why an electron microscope shows more detail of cell structure than a light microscope. *(4 marks)*

(c) The length of mitochondria can vary from 1.5 µm to 10 µm but their width never exceeds 1 µm. Explain the advantage of the width of mitochondria being no more than 1 µm. *(1 mark)*

AQA, 2004

3 (a) Oxygen and water move through cell-surface membranes into cells. Describe **two** ways in which these movements are similar. *(2 marks)*

Figure 3 shows the effect of concentration on the rate of uptake of magnesium ions by root hair cells.

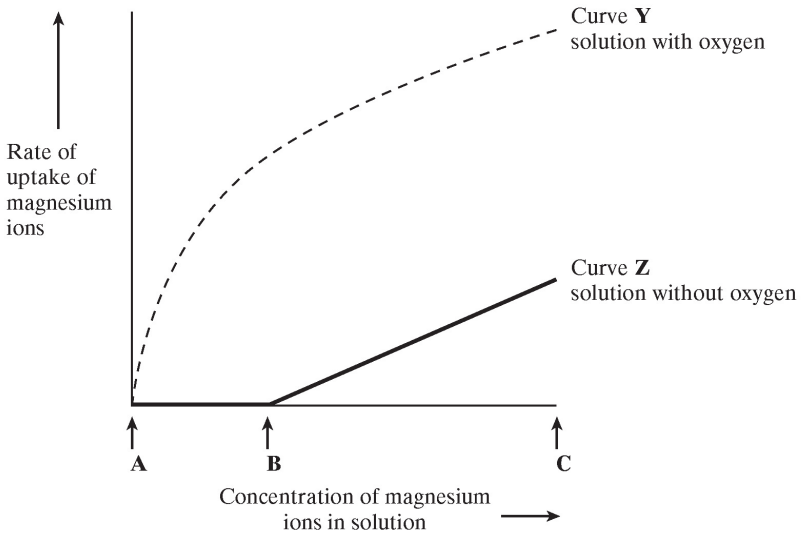

Figure 3

(b) For curve **Y** name the process the cells are using to absorb magnesium ions between concentrations **A** and **B**. Use information in the graph to explain your answer. *(2 marks)*

(c) In the solution without oxygen, explain why no magnesium ions are taken up between concentrations **A** and **B**. *(1 mark)*

(d) For curve Z explain why the rate of uptake increases between **B** and **C**. *(1 mark)*

AQA, 2004

4 **Figure 4** shows part of a cell-surface membrane.

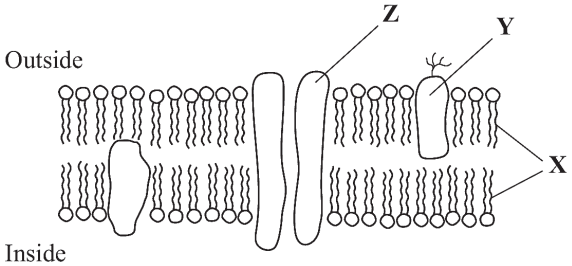

Figure 4

(a) Describe **two** functions of the structure made from the parts labelled **X**. *(2 marks)*

(b) Give **one** function of the molecule labelled **Y**. *(1 mark)*

(c) The part labelled **Z** is involved in facilitated diffusion of substances across the membrane.

(i) Give **one** similarity in the ways in which active transport and facilitated diffusion transport substances across the membrane.

(ii) Give **one** way in which active transport differs from facilitated diffusion.

(iii) **Figure 5** shows the relationship between the concentration of a substance outside a cell and the rate of entry of this substance into the cell.

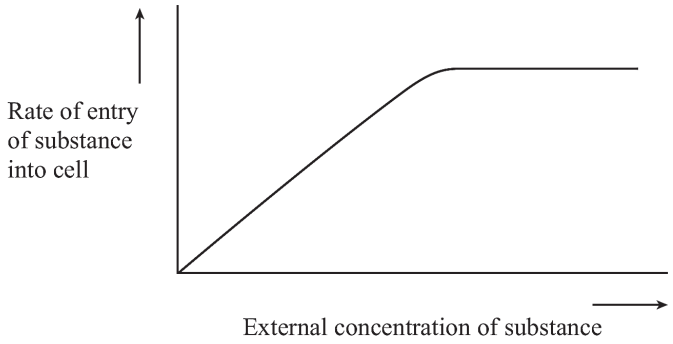

Figure 5

Explain the evidence from the graph that this substance is entering the cell by facilitated diffusion and not by simple diffusion. *(4 marks)*

AQA, 2006

5 Mitochondria were isolated from liver tissue using differential centrifugation. The tissue was chopped in cold, isotonic buffer solution. A buffer solution maintains a constant pH. The first stages in the procedure are shown in **Figure 6**.

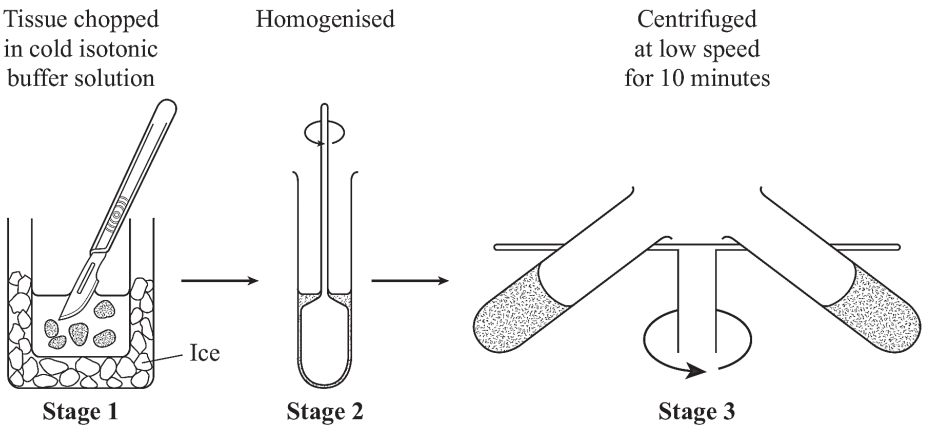

Figure 6

(a) The tissue was chopped in cold, isotonic buffer solution. Explain the reason for using:

(i) a cold solution

(ii) an isotonic solution

(iii) a buffer solution. *(3 marks)*

(b) Why is the liver tissue homogenised? *(1 mark)*

(c) Describe what should be done after **Stage 3** to obtain a sample containing only mitochondria. *(2 marks)*

AQA, 2006