

CANDIDATE
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BIOLOGY

9700/21

Paper 2 AS Level Structured Questions

May/June 2018

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.

You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **16** printed pages.

Answer **all** questions.

- 1 Fig. 1.1 is a transmission electron micrograph of a cell from the root of thale cress, *Arabidopsis thaliana*.

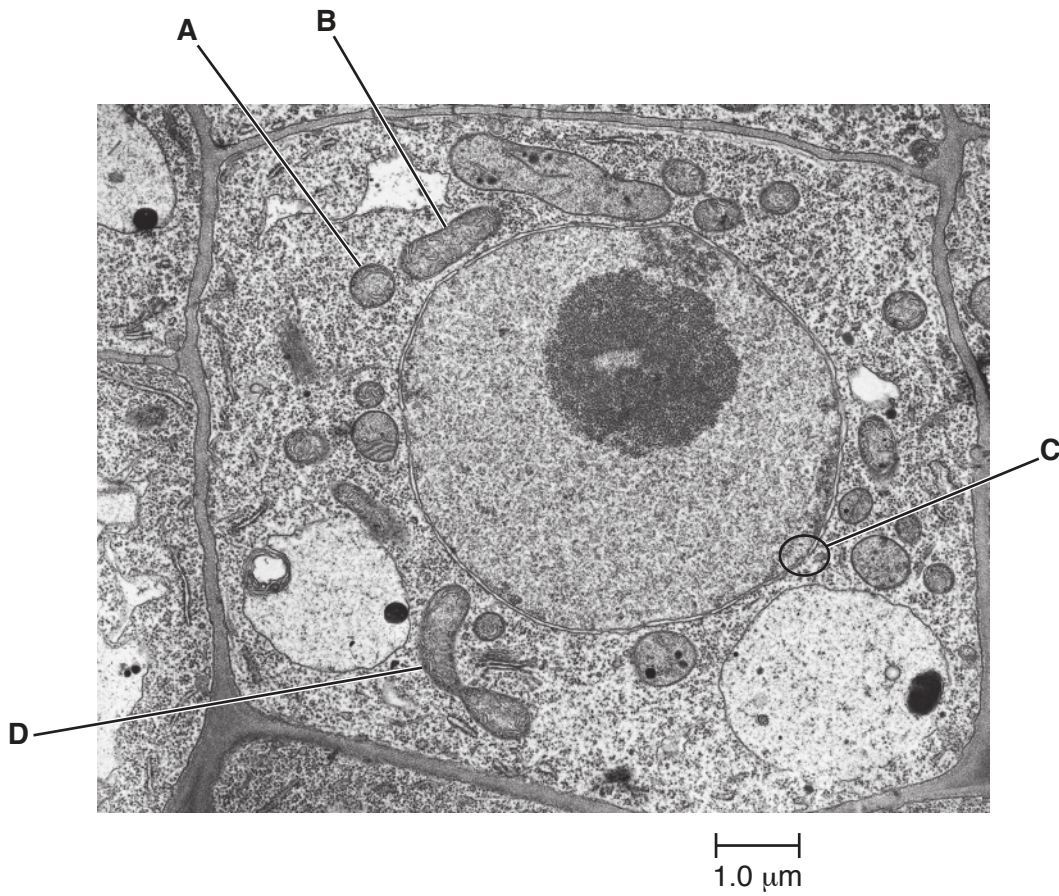


Fig. 1.1

- (a) (i) The structures labelled **A** and **B** on Fig. 1.1 are sections of two mitochondria. Suggest why **A** and **B** are different shapes.

.....
.....
.....[1]

- (ii) The structure labelled **D** on Fig. 1.1 is a mitochondrion about to divide. Explain the importance of the division of mitochondria for the cell shown in Fig. 1.1 and for cells in the root tips of thale cress.

.....
.....
.....
.....
.....[2]

- 2 (a) Sucrose is a disaccharide.

Fig. 2.1 shows how sucrose is broken down in a reaction with hydrochloric acid.

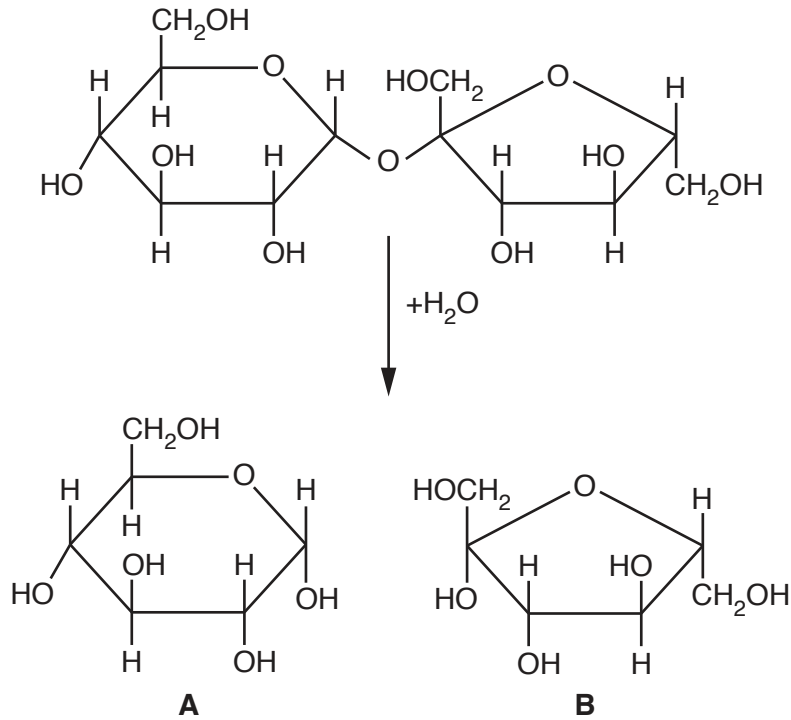


Fig. 2.1

- (i) Name the products, **A** and **B**, of the reaction shown in Fig. 2.1.

A

B [2]

- (ii) Name the type of bond that is broken in the reaction shown in Fig. 2.1.

..... [1]

- (iii) State the type of reaction shown in Fig. 2.1.

..... [1]

- (b) When Benedict's solution is added to a sucrose solution and put into a boiling water-bath, no change in colour is observed.

State why no colour change is observed.

.....

..... [2]

(c) State **one** variable that the researchers should keep constant in **both** investigations **and** explain your answer in terms of enzyme action.

variable

.....

explanation

.....

.....

.....[2]

(d) There are many advantages of using immobilised enzymes in industry.

Suggest **two** advantages of using immobilised enzymes in industry **other than** remaining active over a greater range of pH.

.....

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.....

.....

.....[2]

[Total: 10]

4 Fig. 4.1 is a ribbon model of a molecule of haemoglobin.

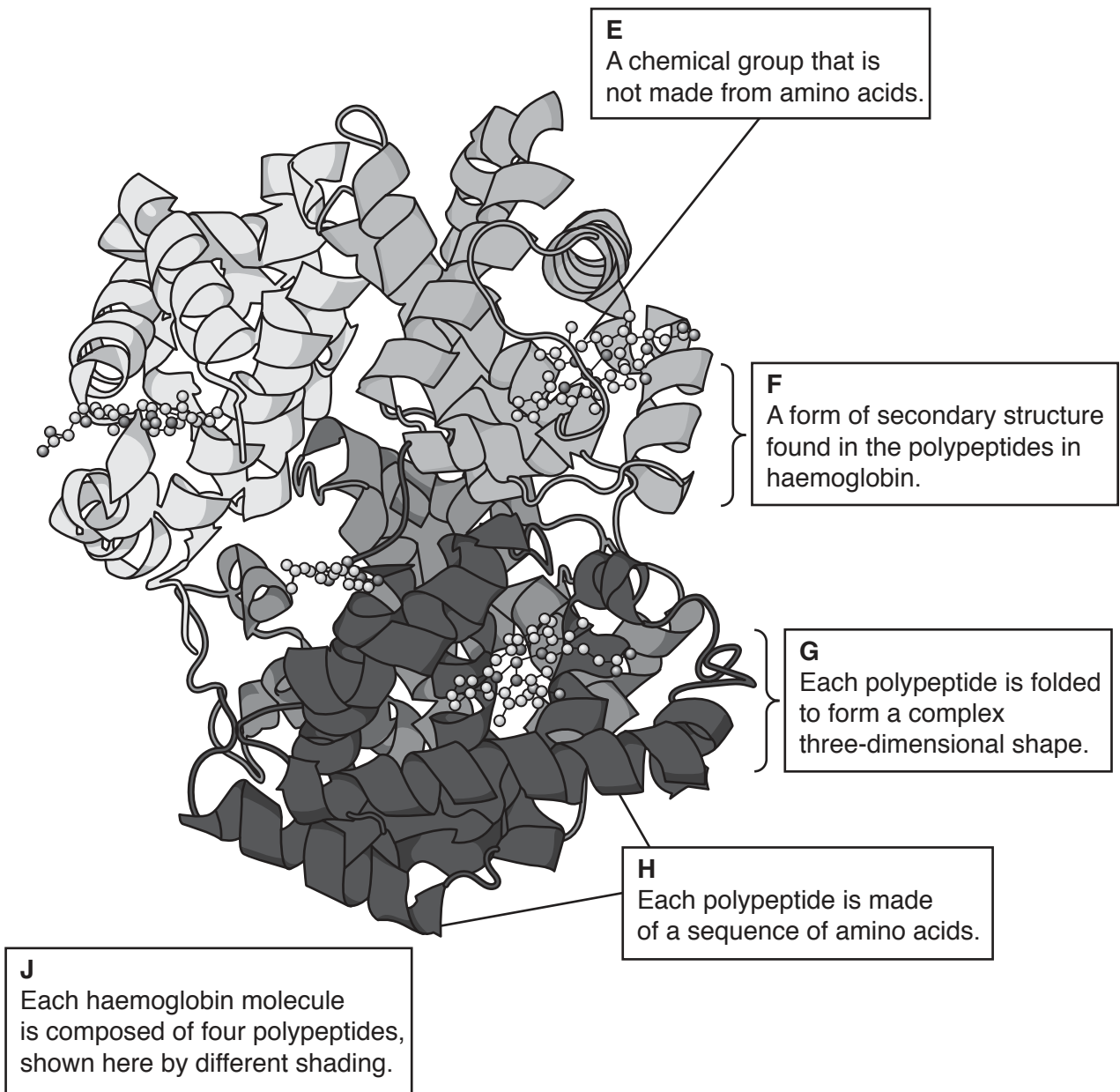


Fig. 4.1

(a) State the term that matches each of the descriptions given in boxes E, F, G, H and J in Fig. 4.1.

E

F

G

H

J

[5]

- (b) The effect of carbon dioxide on the percentage saturation of haemoglobin with oxygen was investigated.

A sample of mammalian blood was exposed to a gas mixture that contained increasing partial pressures of oxygen (pO_2). Throughout the investigation the partial pressure of carbon dioxide (pCO_2) was maintained at 5.3 kPa. The percentage saturation of haemoglobin in the sample was determined as the pO_2 increased.

The investigation was repeated with a second sample of blood in which the pCO_2 was maintained at 10.7 kPa.

The results are shown in Fig. 4.2.

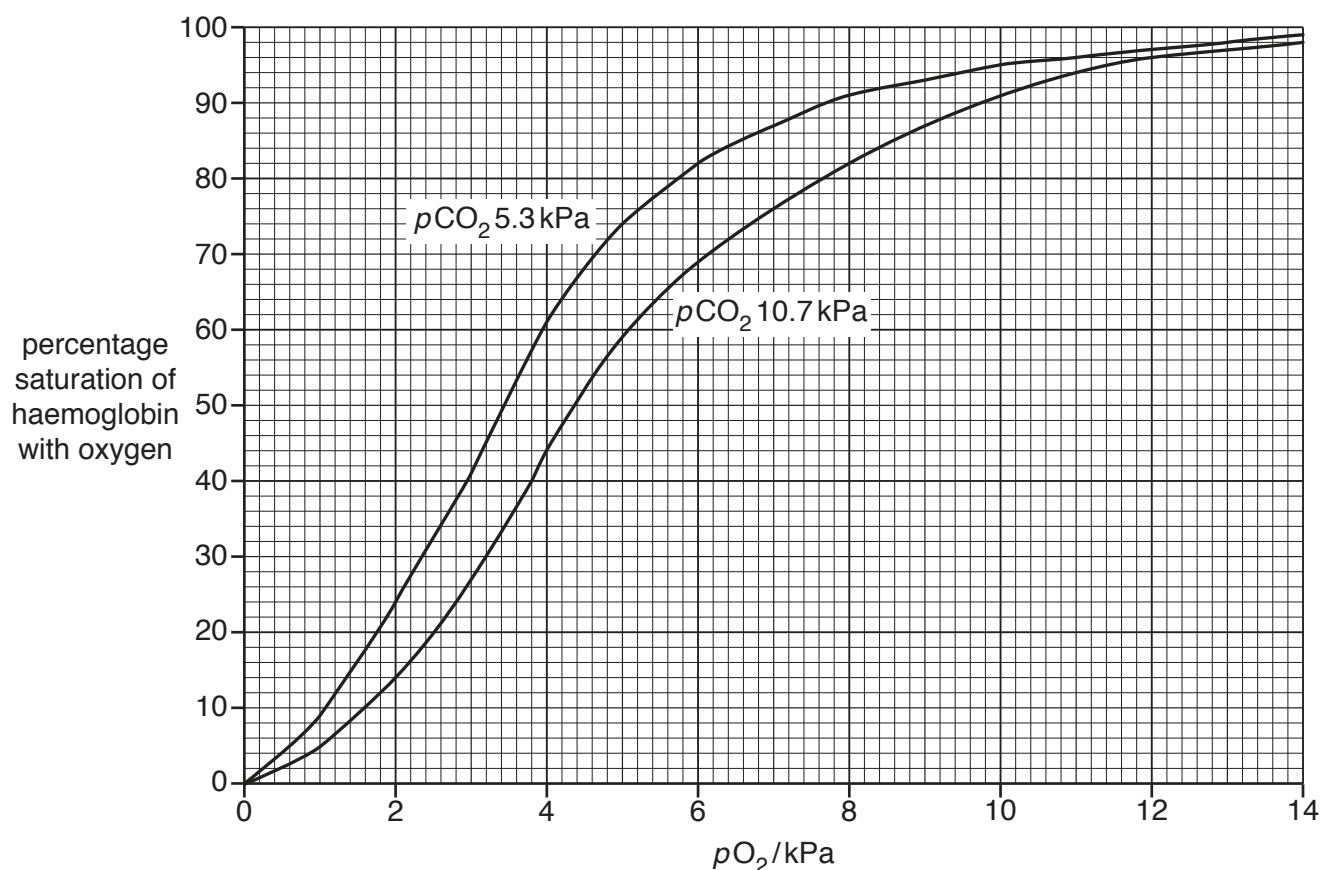


Fig. 4.2

- (i) The pO_2 in alveolar air is 13.0 kPa and the pCO_2 is 5.3 kPa.

Use Fig. 4.2 to suggest the percentage saturation of haemoglobin in blood entering the pulmonary veins.

.....[1]

6 Water absorbed by plant roots travels by different pathways from root hairs to the xylem.

Fig. 6.1 shows these pathways in the root of *Ranunculus acris*.

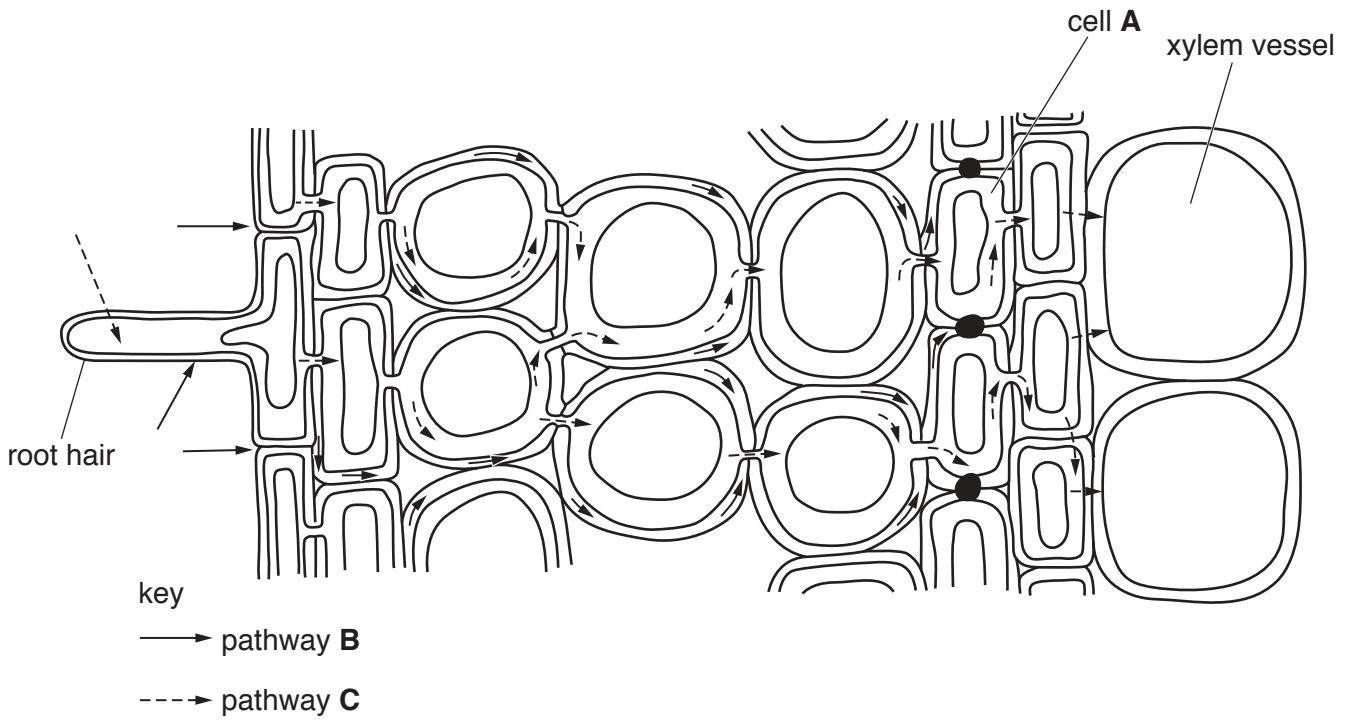


Fig. 6.1

(a) Name cell A and pathway B as shown in Fig. 6.1.

cell A

pathway B

[2]

(d) Ions are taken up by root hair cells using active transport and facilitated diffusion.

Describe **two** ways in which facilitated diffusion differs from active transport.

1

.....

.....

.....

2

.....

.....

.....

[2]

[Total: 11]

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