



ADVANCED SUBSIDIARY GCE

HUMAN BIOLOGY

Molecules, Blood and Gas Exchange

F221

Candidates answer on the Question Paper

OCR Supplied Materials:

- None

Other Materials Required:

- Electronic calculator
- Ruler (cm/mm)

**Tuesday 12 January 2010
Morning**

Duration: 1 hour



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- Where you see this icon you will be awarded marks for the quality of written communication in your answer.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

- 1 (a) The cells in the human body and in plants are eukaryotic cells.

State what is meant by a *eukaryotic cell*.

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

- (b) The different organelles within a cell may be seen using an electron microscope.

Fig. 1.1 is an electron micrograph of a plant cell showing cell organelles. The organelle labelled **D** is shown at a higher magnification in Fig. 1.2.

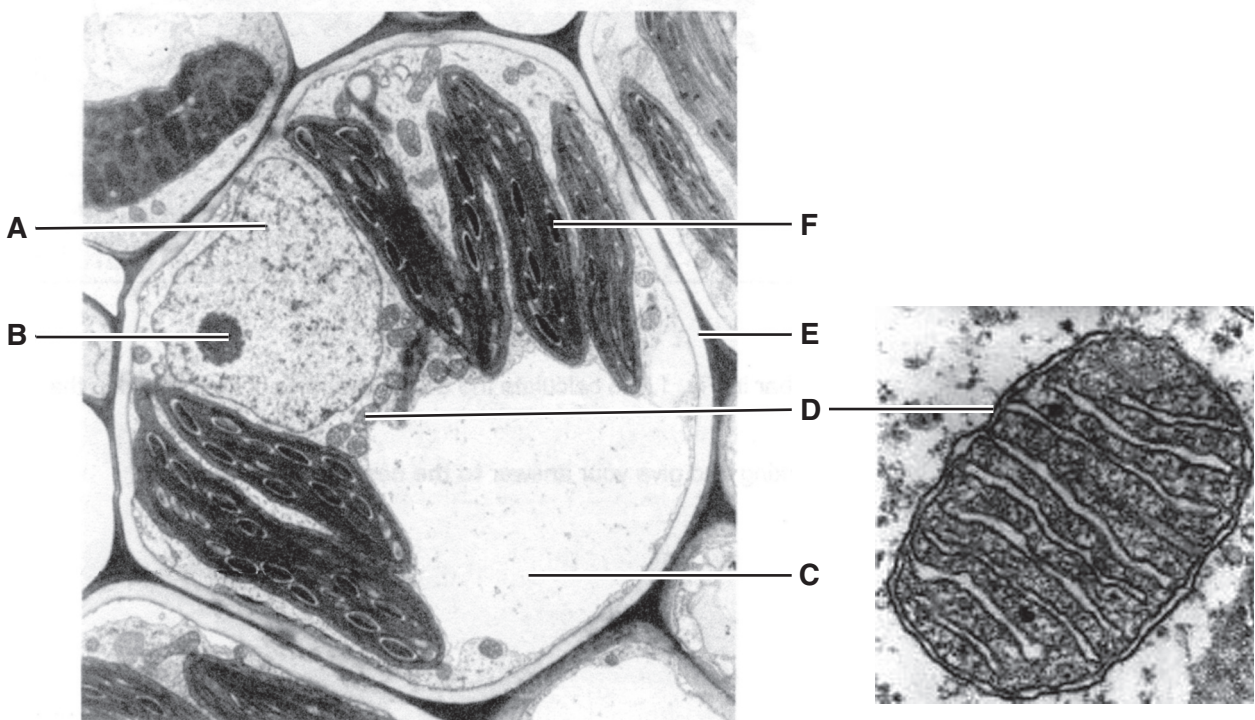


Fig. 1.1

Fig. 1.2

- (i) Name the cell organelles labelled **A** to **C** in Fig. 1.1.

A
B
C [3]

(ii) State **one** function of each of the organelles labelled **D** to **F**.

D

E

F [3]

(c) Fig. 1.3 is an electron micrograph showing a lymphocyte.

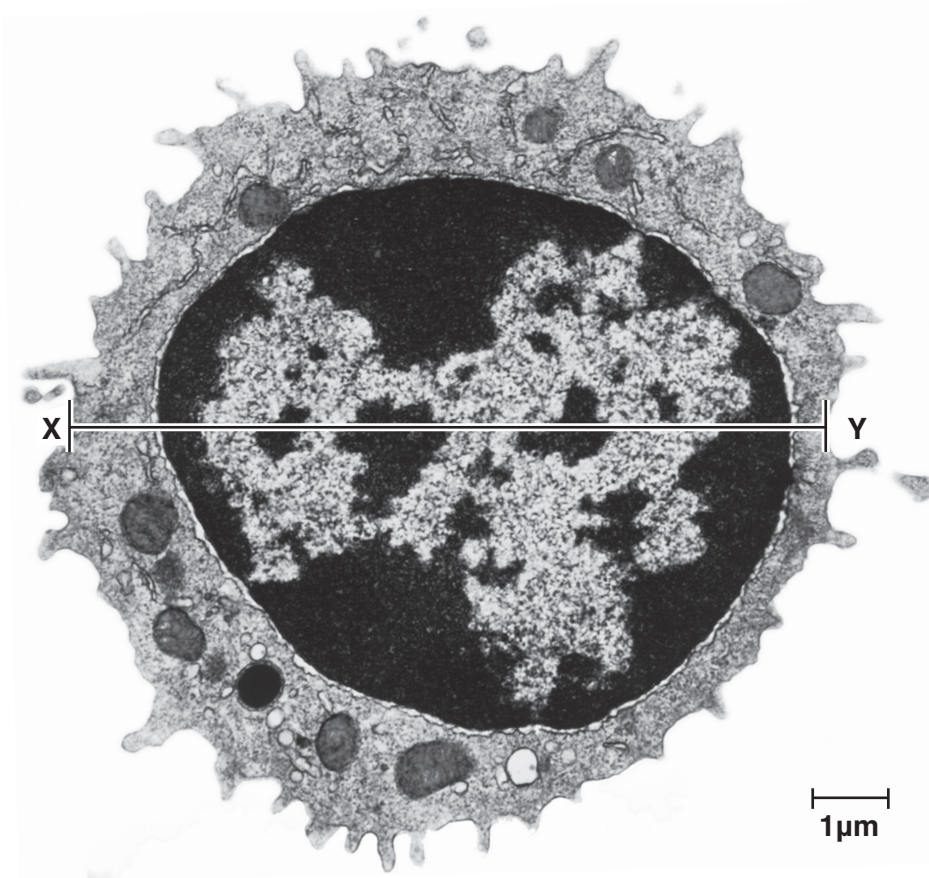


Fig. 1.3

Use the scale bar in Fig. 1.3 to calculate the actual diameter of the cell along the line **X – Y**.

Show your working **and** give your answer **to the nearest whole number**.

Answer = μm [2]

[Total: 9]

Turn over

3 A circulatory system transports many materials around the body.

Fig. 3.1 shows a diagram of the double circulatory system of the human body. This system is an example of a closed circulatory system.

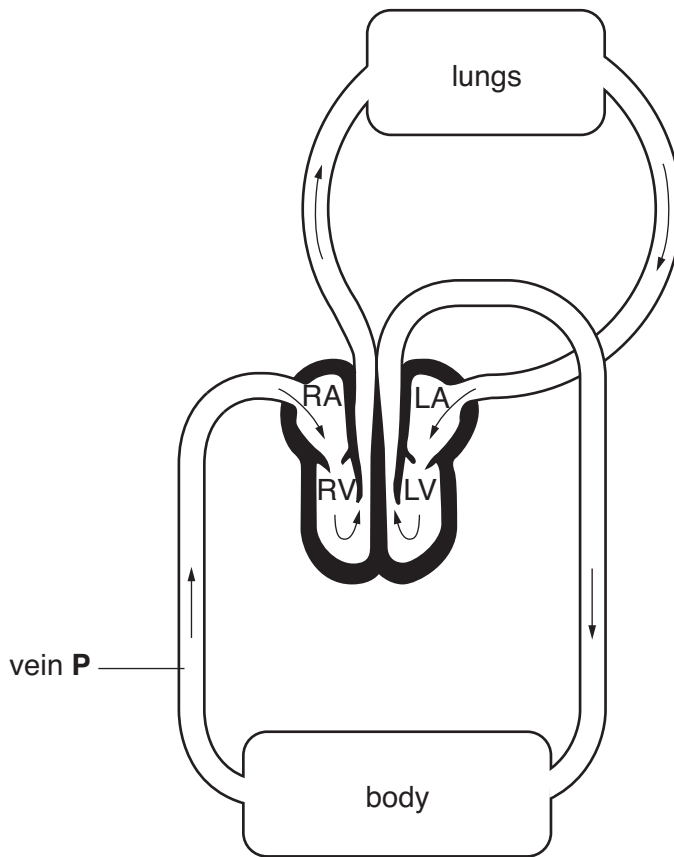


Fig. 3.1

(a) (i) Explain what is meant by the terms ‘double circulatory system’ and ‘closed circulatory system’.

double circulatory system

.....

closed circulatory system

..... [2]

(ii) Give **two** advantages of a double circulatory system.

.....

.....

.....

.....

..... [2]

(iii) Give **two** reasons why large organisms such as humans need a circulatory system.

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

(b) Fig. 3.2 is a diagram of a cross section through **vein P** from Fig. 3.1.

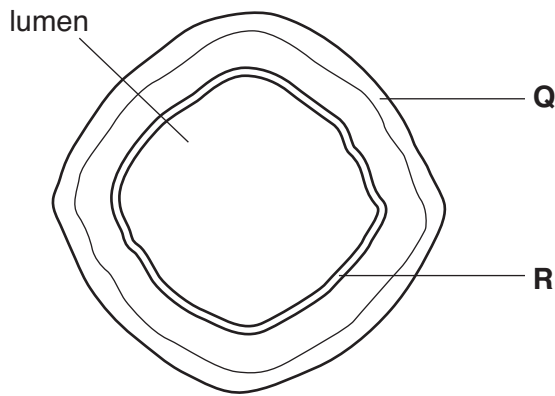


Fig. 3.2

(i) **Name vein P.**

..... [1]

(ii) Name the parts of the vein labelled **Q** and **R** in Fig. 3.2.

Q

R [2]

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QUESTION 4 STARTS ON PAGE 10

- 5 (a) Humans have a specialised gas exchange surface in the lung.

Fig. 5.1 is a photomicrograph of the tissue in the lung.

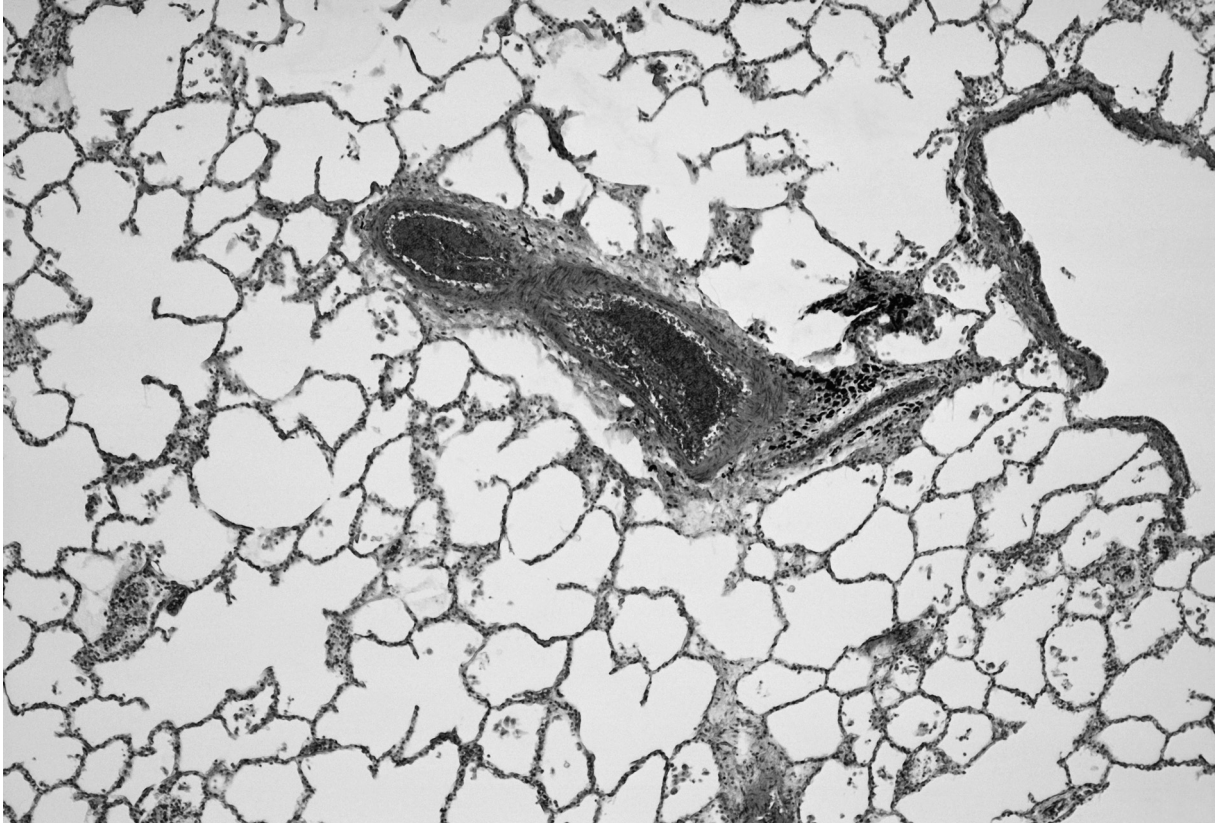


Fig. 5.1

Describe **how** the lung provides each of the following four conditions needed for an efficient gas exchange surface:

- large surface area
- thin surface
- steep diffusion gradient across the surface
- protection from drying out.

large surface area

.....

.....

thin surface

.....

.....

steep diffusion gradient across the surface

.....

.....

.....

.....

protection from drying out

.....

..... [5]

(b) Elastic fibres are found in the lung.

(i) State where elastic fibres are found in the lung.

..... [1]

(ii) Describe the role of these elastic fibres.

.....

.....

..... [2]

[Total: 8]

6 Lipids are a group of substances that are insoluble in water.

(a) Triglycerides are examples of lipids that are often used as energy stores in humans.

Fig. 6.1 is a diagram of a triglyceride molecule.

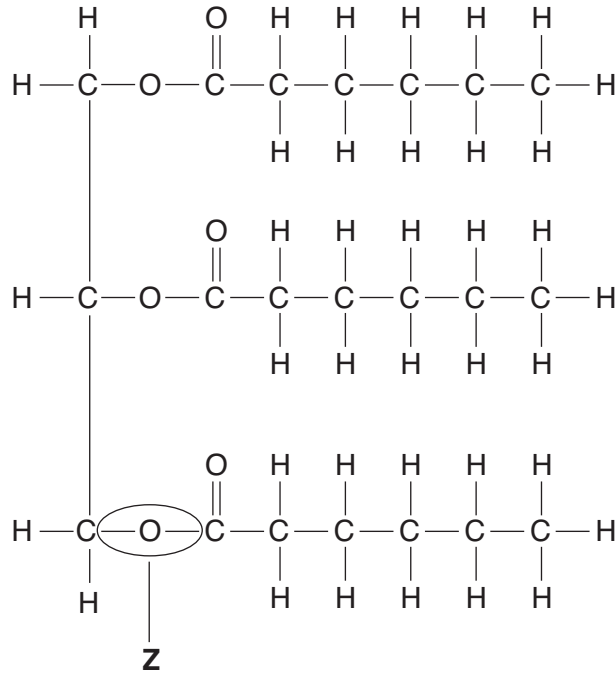


Fig. 6.1

(i) Name the type of bond labelled **Z** on Fig. 6.1.

..... [1]

(ii) Describe how bond **Z** is formed.



In your answer, you should use appropriate technical terms, spelt correctly.

.....

 [3]

(b) A phospholipid is another example of a lipid molecule.

(i) State **two** ways in which the **structure of a phospholipid** molecule differs from a triglyceride molecule.

- 1
-
- 2
- [2]

(ii) Describe the properties of phospholipid molecules that help them to carry out their function in cells.

-
-
-
-
-
-
-
-
-
- [3]

[Total: 9]

END OF QUESTION PAPER

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