

**ADVANCED SUBSIDIARY GCE
HUMAN BIOLOGY**

Blood, Circulation and Gaseous Exchange

WEDNESDAY 9 JANUARY 2008

2856

Morning
Time: 1 hour

Candidates answer on the question paper.

Additional materials: Electronic calculator
Ruler (cm/mm)



Candidate
Forename

Candidate
Surname

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or 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.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

FOR EXAMINER'S USE

Qu.	Max.	Mark
1	10	
2	8	
3	12	
4	9	
5	11	
6	10	
TOTAL	60	

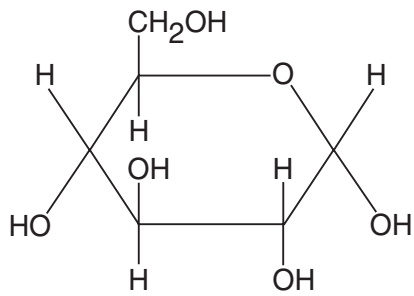
This document consists of **14** printed pages and **2** blank pages.

Answer **all** the questions.

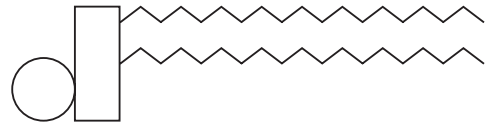
- 1 The human body is made up of many different molecules.

Fig. 1.1 shows the structures of some of these molecules.

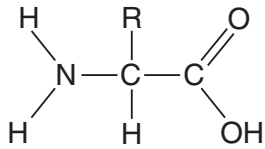
A



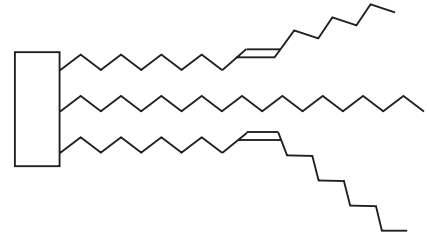
B



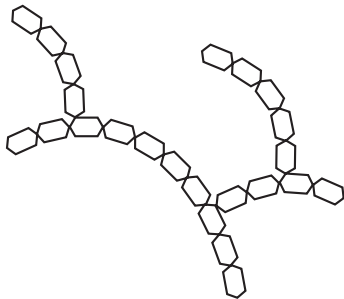
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D



E



F

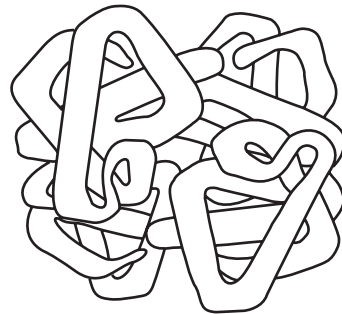


Fig. 1.1

(a) (i) Using letters **A** to **F**, state which molecule in Fig. 1.1 represents:

glycogen

a triglyceride [2]

(ii) Using letters **A** to **F**, state a molecule in Fig. 1.1 that contains:

peptide bonds

ionic bonds

ester bonds [3]

(b) Glycogen is an energy storage molecule.

(i) Name **two** organs that store glycogen.

1

2 [2]

(ii) Describe how the **structure** of glycogen is related to its role as an energy storage molecule.

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

- 2 If a blood vessel is damaged, clot formation rapidly prevents blood loss.

Fig. 2.1 shows some of the events that take place during blood clotting.

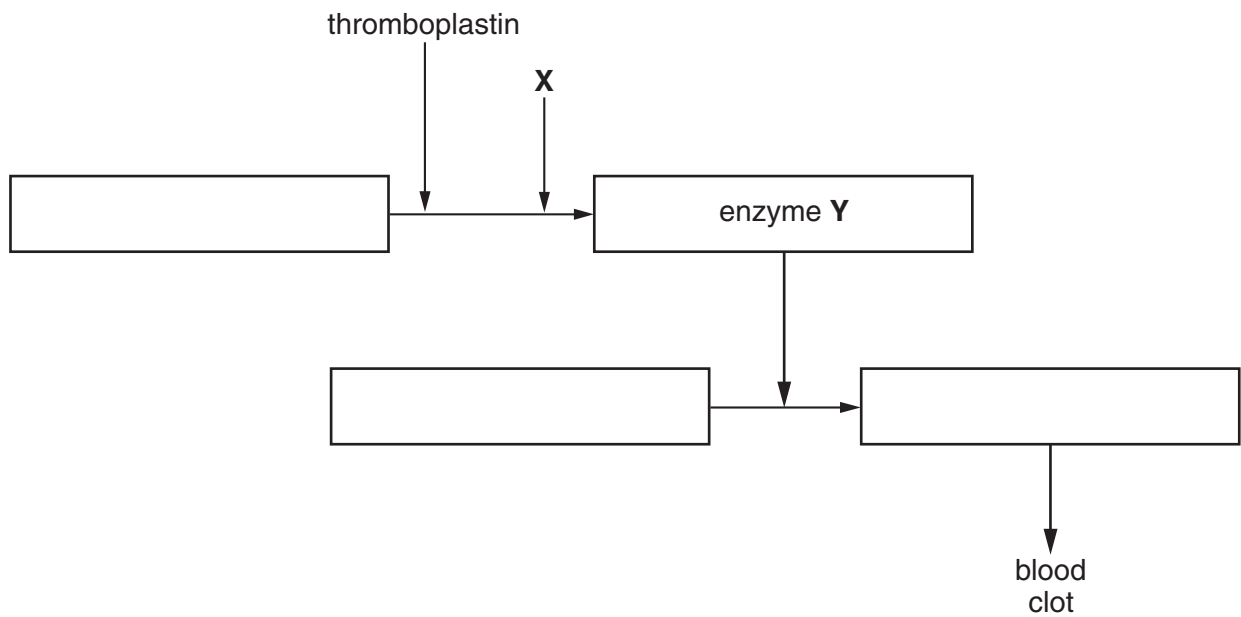


Fig. 2.1

- (a) (i) Complete the diagram by filling in the boxes. [3]
 (ii) Name the ions labelled X.

..... [1]

(b) Fig. 2.2 shows the structure of enzyme **Y**, its normal substrate and another molecule, **Z**.

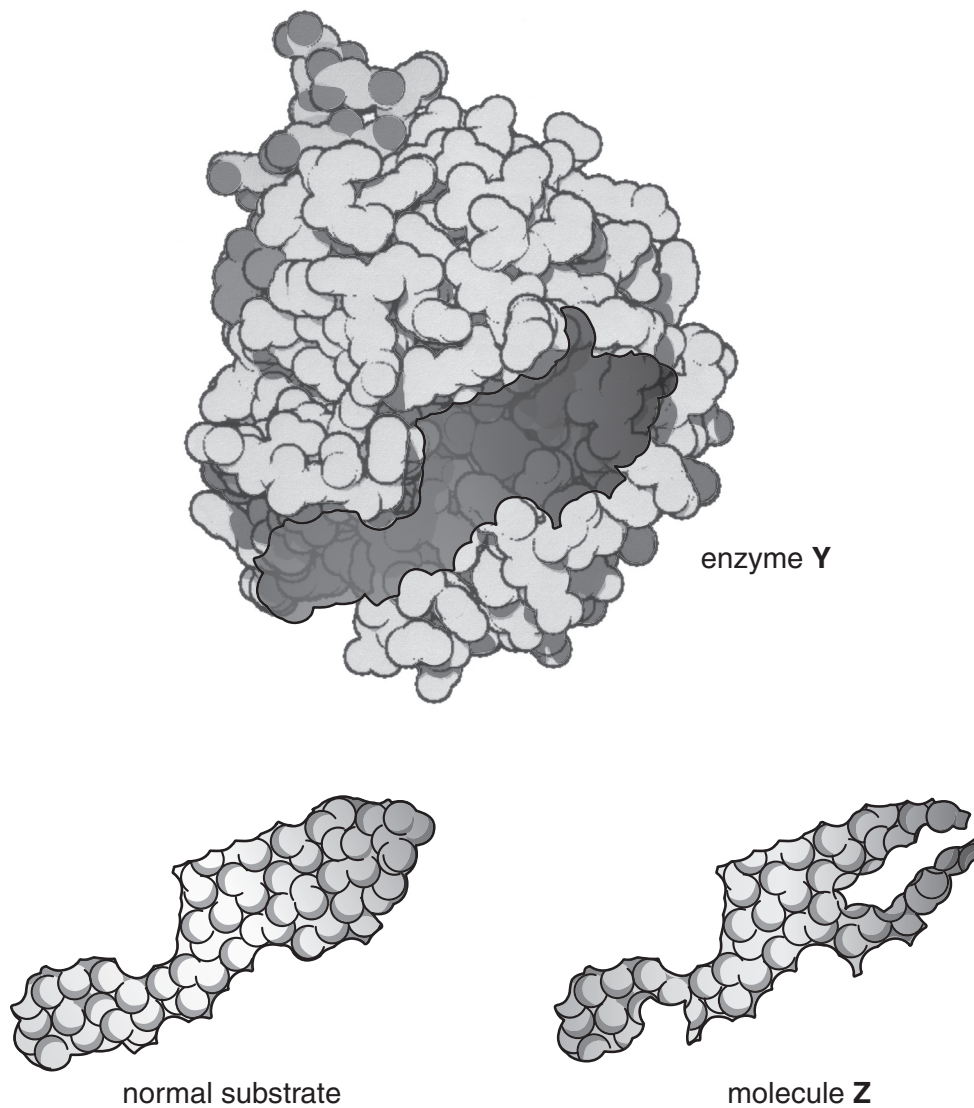


Fig. 2.2

Describe how molecule **Z** may affect the function of enzyme **Y**.

.....

.....

.....

.....

.....

.....

..... [4]

Describe how an atheroma can develop in coronary arteries **and** how this can result in myocardial infarction.

[8]

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- (b) Following a myocardial infarction, a coronary bypass is often performed to improve the health of a patient with severe CHD.

Outline the main features of a coronary bypass procedure.

.....

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..... [3]

[Total: 12]

4 Fig. 4.1 shows two types of cells found in and around alveoli.

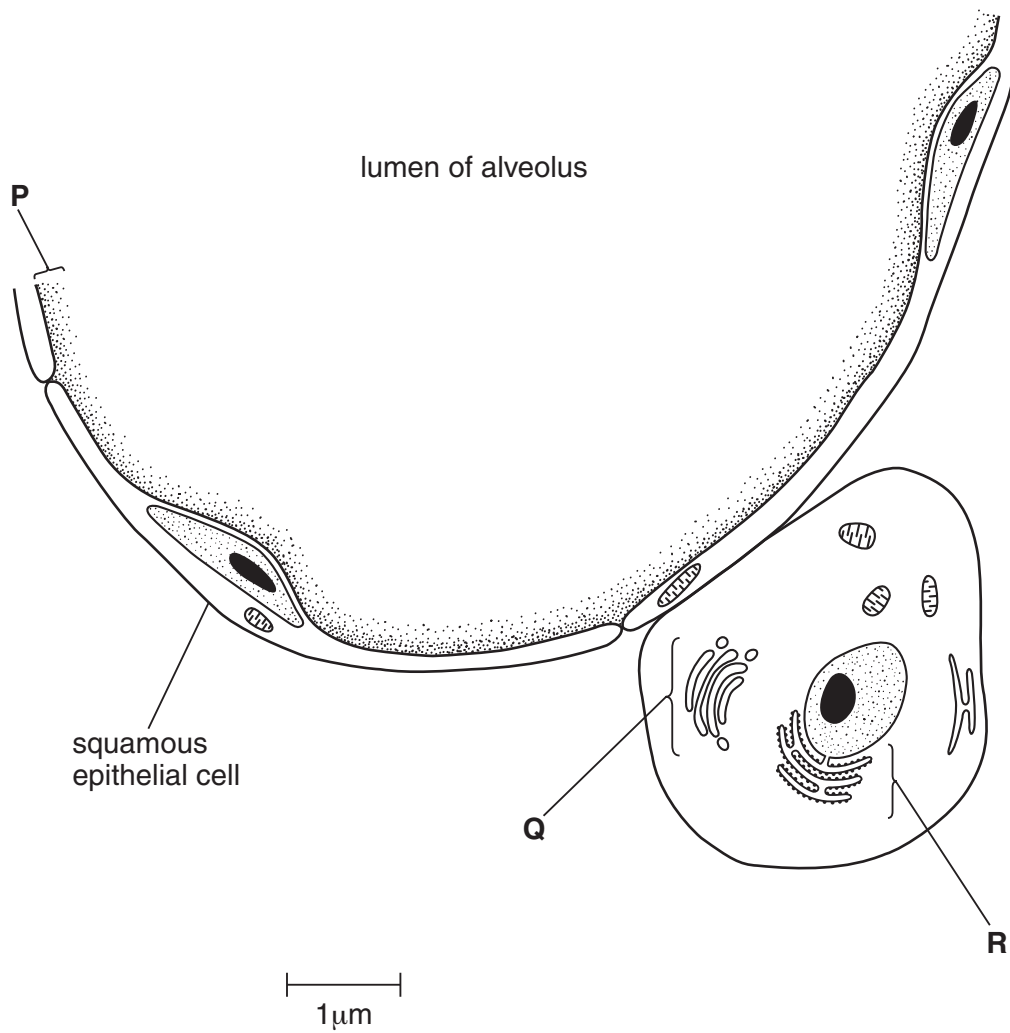


Fig. 4.1

(a) (i) Name **P**, **Q** and **R**.

P

Q

R [3]

(ii) Using the scale bar shown in Fig. 4.1, calculate the magnification of the diagram.

Show your working.

Answer = [2]

- (b) Explain how the squamous epithelial cells shown in Fig. 4.1 are adapted for gaseous exchange.

.....

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.....

.....

..... [2]

- (c) State why the cells shown in Fig. 4.1 could **not** be plant cells.

.....

..... [2]

[Total: 9]

- 5 The prevalence of chronic lung disease in the UK has increased considerably in the last 10 years and is now greater than the European Union average.

‘Lung disease’ covers a wide range of different diseases.

- (a) Name **two** lung diseases that are linked to cigarette smoking.

1

2 [2]

- (b) Name a lung disease which can be triggered by the body responding to allergens.

..... [1]

- (c) Describe the main symptoms of tuberculosis (TB).

.....

.....

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.....

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..... [3]

- (d) One way to assess the health of a person's respiratory system is to measure lung function.

Table 5.1 shows some information about lung function measurements.

Table 5.1

measurement	description
tidal volume	the volume of air inhaled or exhaled during a single breath
	the volume of air exhaled in the first second of a forced expiration
Peak Expiratory Flow Rate (PEFR)	
vital capacity	

- (i) Complete Table 5.1 by filling in the missing information.
The first row has been done for you.

[3]

- (ii) In cases of TB, the tidal volume decreases.

Explain why this happens.

.....

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.....

..... [2]

[Total: 11]

6 The passage of substances into and out of a cell is controlled by the cell surface membrane.

- (a) Describe how **phospholipid molecules** are arranged in the cell surface membrane of a red blood cell.

You may wish to use a labelled diagram in your answer.

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[2]

- (b) Describe **and** explain what would happen to red blood cells if they were placed in distilled water.

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..... [4]

(c) Red blood cells take up oxygen and glucose for respiration from plasma.

Fig. 6.1 shows how the uptake of:

- oxygen varies with the concentration of oxygen in the surrounding fluid
- glucose varies with the concentration of glucose in the surrounding fluid.

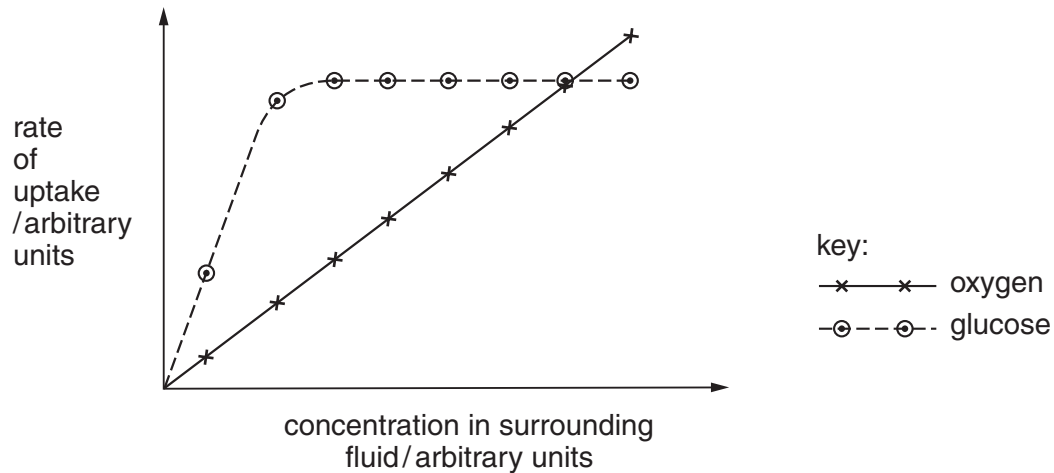


Fig. 6.1

- (i) Explain why the rate of uptake of oxygen increases as the concentration of oxygen in the surrounding fluid increases.

.....

 [2]

- (ii) Glucose is transported across the cell surface membrane by facilitated diffusion.

Explain the shape of the curve for glucose.

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 [2]

[Total: 10]

END OF QUESTION PAPER

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