

**ADVANCED SUBSIDIARY GCE
HUMAN BIOLOGY**

Blood, Circulation and Gaseous Exchange

2856

Candidates answer on the question paper

Additional Materials (Enclosed):

- Insert (inserted)

Other Materials Required:

- Electronic Calculator
- Ruler (cm/mm)

**Monday 1 June 2009
Afternoon**

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**.
- 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.
- This document consists of **12** pages. Any blank pages are indicated.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	10	
2	16	
3	8	
4	10	
5	6	
6	10	
TOTAL	60	

Answer **all** the questions.

- 1** The body contains an estimated 62 000 miles of blood vessels.

Fig. 1.1, **on the insert**, shows cross-sections of two types of blood vessel.

- (a) (i)** Name the types of blood vessels labelled **X** and **Y**.

X.....

Y..... **[1]**

- (ii)** The magnification is given on Fig. 1.1.

Calculate the actual width of vessel **X**, in **mm**, between line **A** and line **B**.

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

Answer = mm **[2]**

- (iii)** Describe the importance of the **endothelium** in arteries and veins.

.....

 **[2]**

(b) A diet that is high in saturated fat can lead to the formation of atheromatous plaques in arteries.

(i) Explain how a diet that is high in saturated fat can lead to the formation of atheroma.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) State **two** risk factors, other than diet, that may contribute to the formation of atheroma.

1

2 [2]

[Total: 10]

- 2** There are many different molecules present in cells. These molecules have different roles in maintaining the health of an individual.

Table 2.1 gives information about some of the molecules found in cells.

- (a)** Complete Table 2.1 by filling in the missing words.

Table 2.1

molecule	example	subunit(s)	chemical elements present	bond between subunits
protein	catalase		C, H, O, N	
lipid	triglyceride			ester
	glycogen	monosaccharides	C, H, O	

[6]

- (b)** Thrombin is an enzyme. It is only active in the presence of a non-protein component called a co-factor.

- (i)** Name the co-factor required for the enzyme thrombin to function.

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

- (ii)** Explain how a co-factor may work.

.....

.....

.....

.....

..... **[3]**

(c) Give **two** roles of triglycerides **in cells**.

1

.....

2

..... [2]

(d) Plasma is the liquid part of blood in which blood cells are carried. Many dissolved substances are present in plasma.

Athletes use isotonic sports drinks before, during and after training.

Explain the importance to athletes of using isotonic drinks.

.....

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.....

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.....

.....

..... [4]

[Total: 16]

- 3** In this question, one mark is available for the quality of spelling, punctuation and grammar.

Describe how a blood smear can be prepared from a blood sample for viewing under a light microscope.

In your answer you should also provide details of a suitable staining procedure.

[7]

Quality of Written Communication [1]

[Total: 8]

4 Damage to the gas exchange surface can result in lung disease.

- (a) Complete the following passage about the gas exchange surface by using appropriate words from the list to fill the gaps.

The words may be used once, more than once or not at all.

active transport	asthma	breathing
CHD	COPD	diffusion
	elastic	
endothelial	epithelial	
facilitated diffusion	insoluble	muscle
respiration	soluble	

The wall of an alveolus consists of a single layer of cells. These cells are surrounded by a network of blood capillaries. fibres are located between the wall of the alveolus and the walls of the capillaries.

..... ensures that the alveoli are continually ventilated. This, along with the circulation of blood, maintains the concentration gradients at the gas exchange surface. The exchange of gases is achieved by the process of

This mechanism is possible because the gas molecules are

..... is a broad term for a number of chronic lung diseases, such as bronchitis.

[6]

QUESTION 4 CONTINUES ON THE NEXT PAGE

- (b) Lung disease may be described as *acute* or *chronic*.

Complete the table below using a tick (✓) to indicate whether the disease may be described as **acute** or **chronic** or **both**.

Table 4.1

disease	acute	chronic
tuberculosis		
asthma		
emphysema		
lung cancer		

[4]

[Total: 10]

5 Fig. 5.1 is a drawing showing the ultrastructure of a generalised human cell.

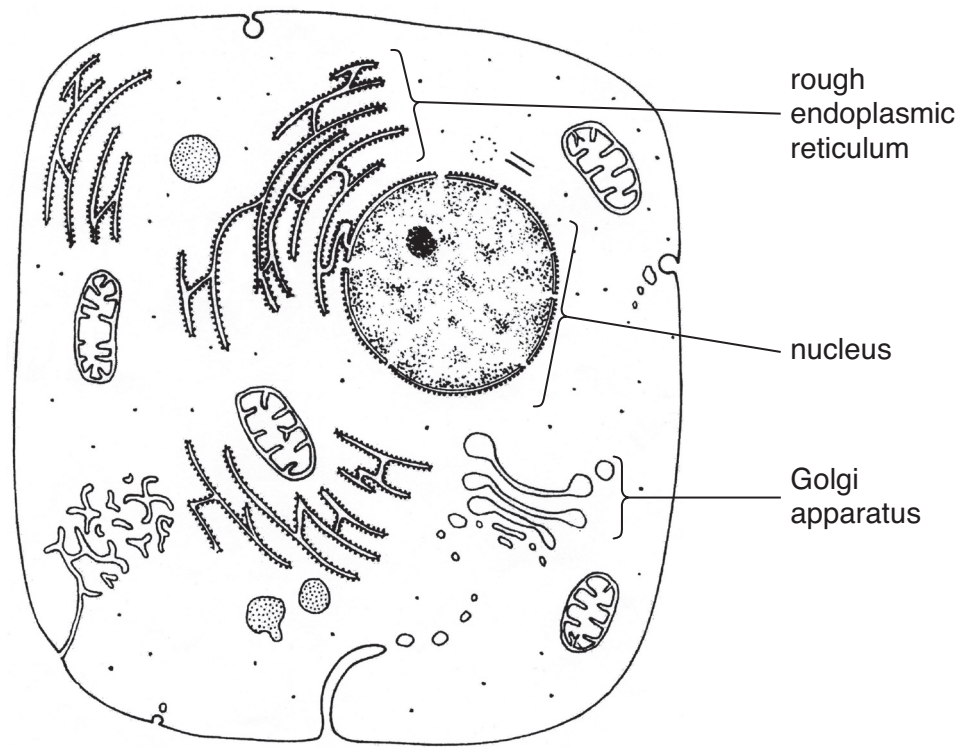


Fig. 5.1

Outline the roles of each of the following organelles:

rough endoplasmic reticulum

.....

.....

.....

nucleus.....

.....

.....

.....

Golgi apparatus.....

.....

.....

..... [6]

[Total: 6]

Turn over

6 Heart function can be monitored using a stethoscope or electrocardiogram (ECG).

Fig. 6.1 shows the pressure changes in the aorta, left ventricle and left atrium during the cardiac cycle. The figure also shows when the heart sounds occur.

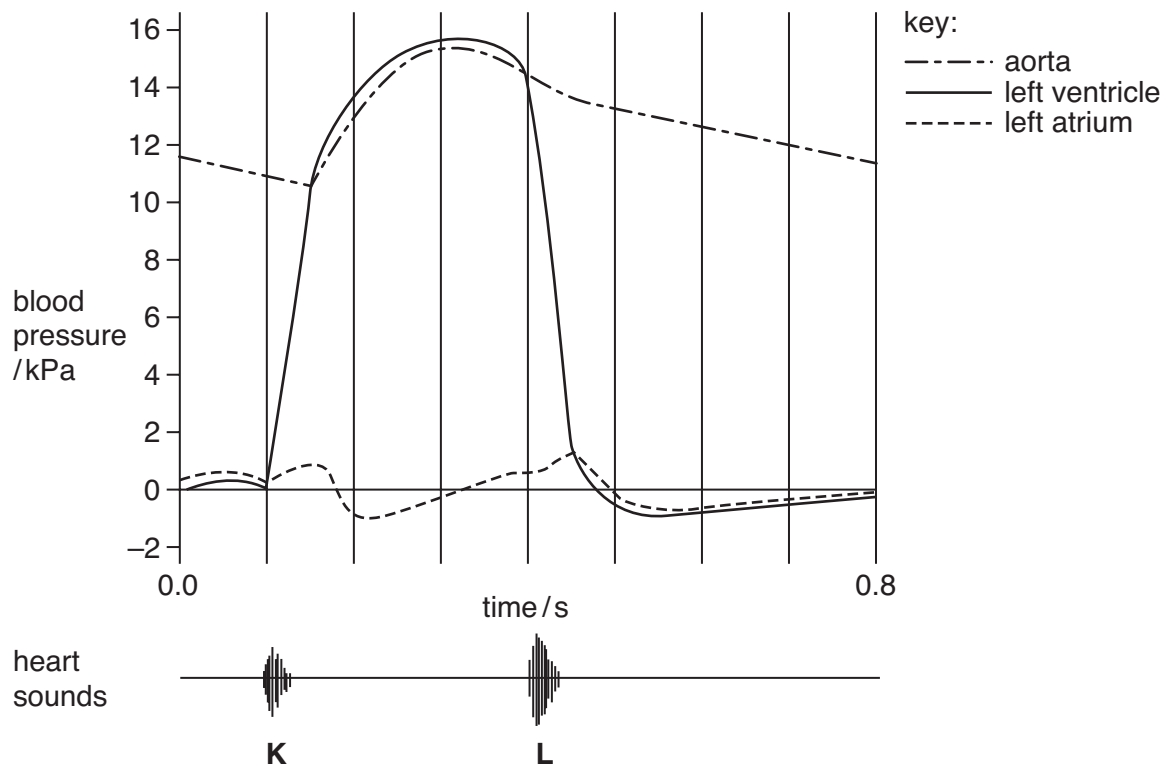


Fig. 6.1

(a) A stethoscope can be used to listen to the heart sounds.

Using the information in Fig. 6.1, explain how the heart sounds **K** and **L** are produced.

[4]

- (b) Suggest why it is important that the atria contract **before** the ventricles contract.

.....

.....

.....

.....

..... [2]

- (c) Fig. 6.1 shows the pressure changes in the left ventricle.

Explain why the pressure changes in the **right ventricle** will be different from the pressure changes in the left ventricle.

.....

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.....

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.....

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.....

.....

..... [4]

[Total: 10]

END OF QUESTION PAPER

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