OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

HUMAN BIOLOGY 2856

Blood, Circulation and Gaseous Exchange

Monday **10 JANUARY 2005** Morning 1 hour

Candidates answer on the question paper.
Additional materials:
Electronic calculator
Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- Read each question carefully before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- 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	7	
2	11	
3	8	
4	12	
5	11	
6	11	
TOTAL	60	

This question paper consists of 11 printed pages and 1 blank page.

Registered Charity Number: 1066969
[Turn over

Answer all the questions.

1 Fig. 1.1 shows the structure of a typical cell surface membrane from a leucocyte.

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Details:

A diagram of the structure of a typical cell sufrace membrane from a leucocyte

Fig. 1.1

(a) Name structures A and B.

A .....

B ..... [2]

(b) Calculate the actual width of the membrane from X to Y. Show your working.

Answer = ... nm [2]

(c) Describe two roles of the cell surface membrane, in a cell such as a leucocyte.

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..... [3]

[Total: 7]

2 **(a)** Fill in the missing words in the following passage about haemoglobin and erythrocytes:

Haemoglobin is the most common oxygen-carrying pigment. It is made up of two parts: a prosthetic group and a ..... protein. The protein part consists of ..... polypeptide chains known as globins, each associated with a complex group called haem. Haem contains the metal element ..... . It is with the haem group that association with oxygen takes place.

Erythrocytes contain haemoglobin, which is able to combine reversibly with oxygen to form ..... . In an adult, these cells have a life span of about ..... months, after which they are destroyed in the ..... . [6]

(b) The cells in blood are contained in plasma. Athletes use isotonic sports drinks before, during and after training to maintain the concentration of the plasma.

(i) Explain what is meant by the term *isotonic*.

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..... [2]

(ii) Outline the importance of using isotonic drinks, with reference to maintaining the concentration of the plasma.

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..... [3]

[Total: 11]

3 In this question, one mark is available for the quality of use and organisation of scientific ideas.

Coronary heart disease is a major cause of death in developed countries. Describe the **surgical** techniques available to treat this disease **and** explain some of the social, ethical and economic consequences of using these techniques.

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Quality of Written Communication [1]

[Total: 8]

4 **(a)** The statements below refer to the blood clotting process.

For each statement name the substance to which it refers.

(i) This protein is released from damaged tissues and starts the clotting process.

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(ii) These ions act as cofactors and are involved in the conversion of prothrombin to thrombin.

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(iii) This protein forms an insoluble mesh over the wound, trapping red blood cells and other blood proteins.

..... [3]

(b) Many airline passengers travelling on long haul flights are becoming increasingly worried about deep vein thrombosis (DVT). A thrombus is a clot that develops inside a blood vessel.

If the thrombus breaks away from the vessel wall and floats freely in the bloodstream, it may cause an embolism.

Suggest how an embolism may become life-threatening.

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(c) Describe how moving around the aircraft may reduce the chances of developing DVT.

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(d) Reversible enzyme inhibitors may be used in the treatment of DVT. Explain how these can work.

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[Total: 12]

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5 It is estimated that 3.4 million people in the United Kingdom have asthma.

Fig. 5.1 shows the number of new cases of asthma diagnosed by doctors between the years 1976 and 2000, in two age groups.

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Details:

A graph showing the number of new cases of asthma diagnosed by doctors between 1976 and 2000

Fig. 5.1

(a) Using the information in Fig. 5.1,

(i) suggest why the figures are presented 'per 100 000 of the age group' ;

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..... [1]

(ii) describe the trends in the number of cases diagnosed between 1976 and 2000 **in both age groups**. Suggest reasons for these trends.

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..... [5]

(b) State **two** possible causes of an asthma attack.

1 .....

2 ..... [2]

(c) Beta agonists are often used to relieve the symptoms of asthma. Describe how these drugs work.

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..... [3]

[Total: 11]

[Turn over

6 Fig. 6.1 shows a vertical section through the respiratory system.

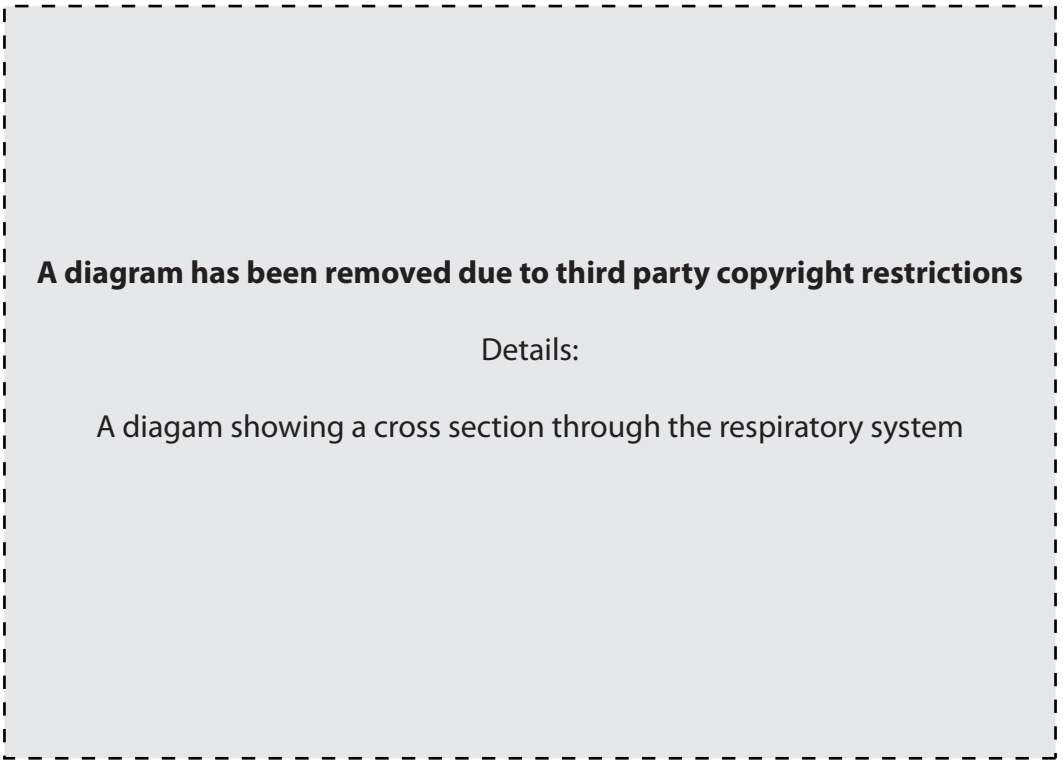

Fig. 6.1

(a) Name structures X, Y and Z.

X .....

Y .....

Z ..... [3]

(b) Describe how heavy smoking may cause bronchitis.

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..... [4]

(c) A doctor may use a spirometer, such as the one shown in Fig. 6.2, to test lung function in a patient with chronic bronchitis.

A diagram has been removed due to third party copyright restrictions

Details:

A diagram showing a spirometer, used to test lung function

Fig. 6.2

Describe how the spirometer is used to measure lung volumes.

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[Total: 11]

END OF QUESTION PAPER