



GCE AS/A level

1072/02

HUMAN BIOLOGY – HB2

P.M. MONDAY, 2 June 2014

1 hour 30 minutes plus your additional time allowance

Surname _____

Other Names _____

Centre Number _____

Candidate Number 2 _____

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	9	
3.	6	
4.	12	
5.	12	
6.	9	
7.	8	
8.	10	
Total	70	

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball-point pen or your usual method.

Write your name, centre number and candidate number in the spaces provided on the front cover.

Answer ALL questions.

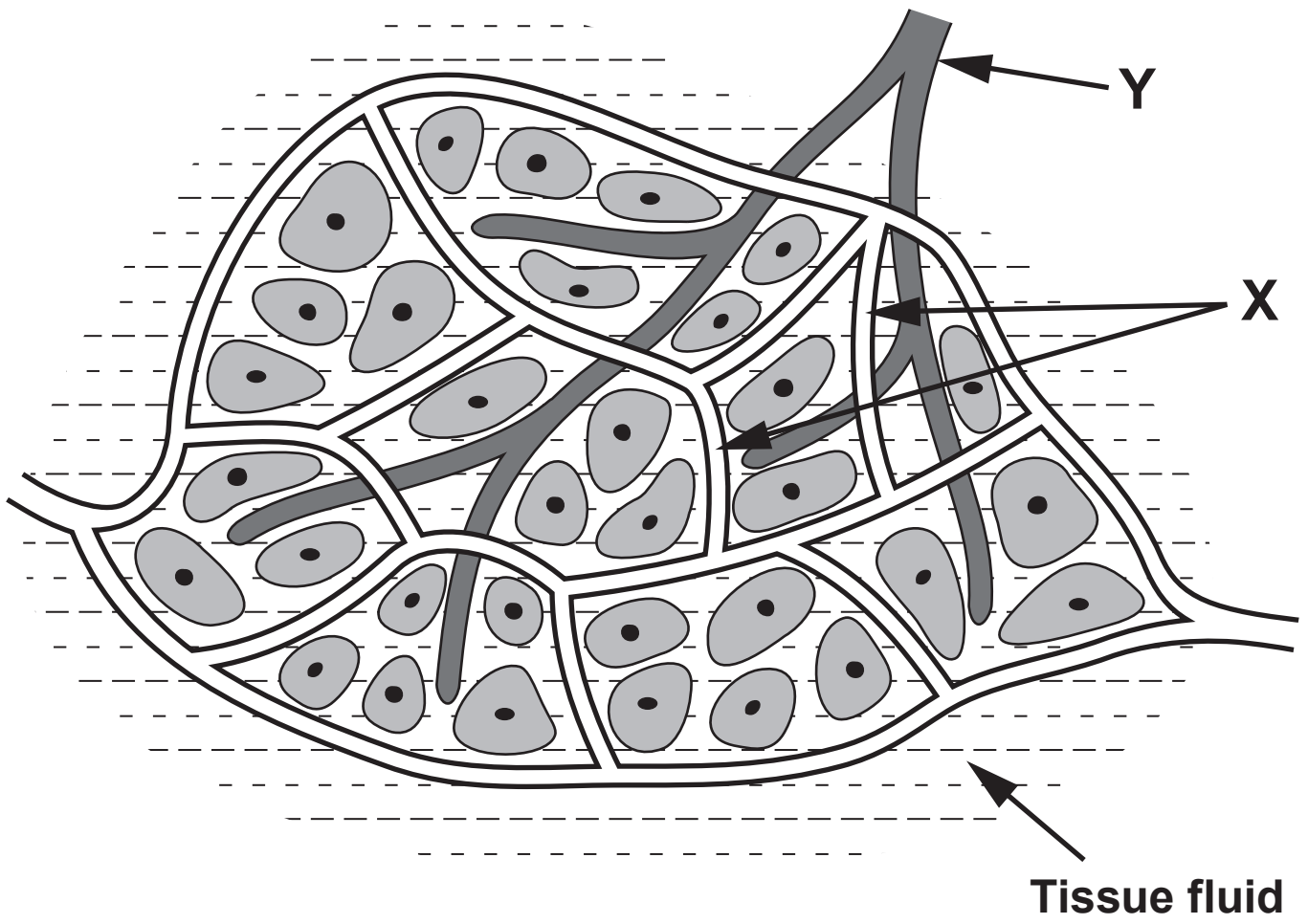
Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

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

You are reminded of the necessity for good English and orderly presentation in your answers.

The quality of written communication will affect the awarding of marks.



Answer ALL questions.

1. The diagram opposite shows two different types of vessel found in the tissues of the human body.

(a) Name the type of blood vessel labelled X in the diagram. [1]

(b) Name the fluid found in vessel Y. [1]

1(c) The movement of water out of the blood vessels into the tissue fluid is caused by high hydrostatic pressure at the arterial end. The reabsorption of most of the water back into the blood at the venous end is due to osmotic pressure.

(i) Name a substance found in the plasma that helps to maintain this osmotic pressure. [1]

(ii) What name is given to the medical condition caused by a low level of this substance in the blood? [1]

4

	Ascariasis	Schistosomiasis
Where in the body the parasite is usually found		
Method of entry of the parasite into the human body		

2. ASCARIS and SCHISTOSOMA are endoparasitic worms that cause diseases in humans.

(a) Explain what is meant by the term ENDOPARASITIC. [1]

(b) Complete the table opposite to show TWO ways in which Ascariasis is different from Schistosomiasis. [4]

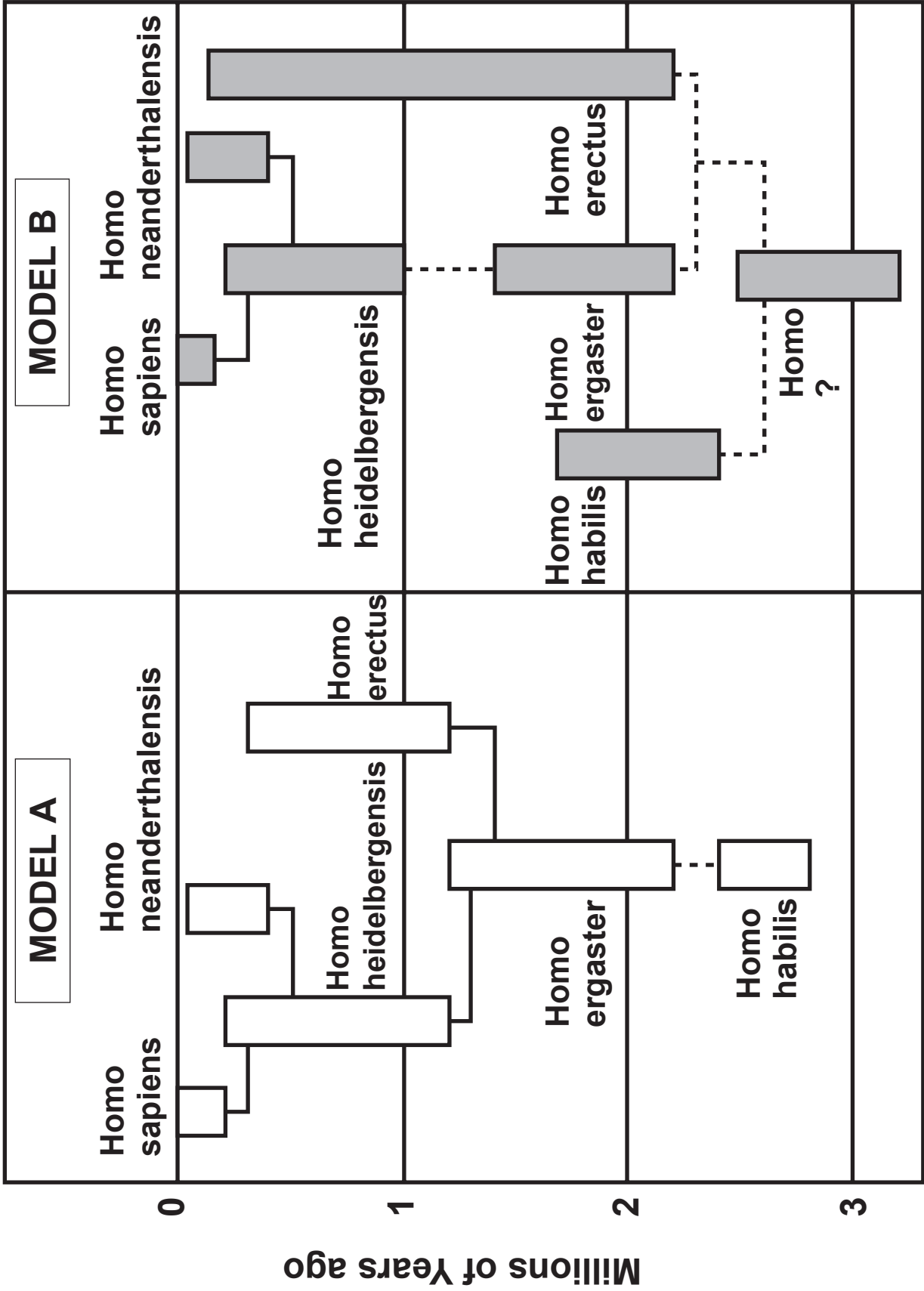
2(c) Heavy infections with both ASCARIS and SCHISTOSOMA can lead to the infected person developing anaemia but for different reasons.

Suggest how these parasites can cause anaemia in infected people.

ASCARIS _____ [2]

2(c) SCHISTOSOMA _____ [2]

9



MODEL B

MODEL A

Homo sapiens
Homo neanderthalensis

Homo sapiens
Homo neanderthalensis

Homo heidelbergensis

Homo erectus

Homo erectus

Homo ergaster

Homo habilis

Homo ergaster

Homo ?

Homo habilis

0

1

2

3

Millions of Years ago

3(a) The diagrams opposite show two different models of human evolutionary relationships based on different interpretations of the same fossil evidence. [1]

(i) Name the type of diagram used to represent these EVOLUTIONARY RELATIONSHIPS. [1]

(ii) Describe ONE similarity and ONE difference in the evolutionary relationships suggested by Model A and Model B. [2]

Similarity _____

Difference _____

3(a) (iii) Suggest why dotted lines have been used in parts of the diagrams. [1]

(b) Evidence shows that HOMO SAPIENS, HOMO NEANDERTHALENSIS and HOMO HEIDELBERGENSIS co-existed in Europe for several thousand years and may have interbred.

Suggest how DNA analysis is helping scientists to develop a better understanding of human evolution. [2]

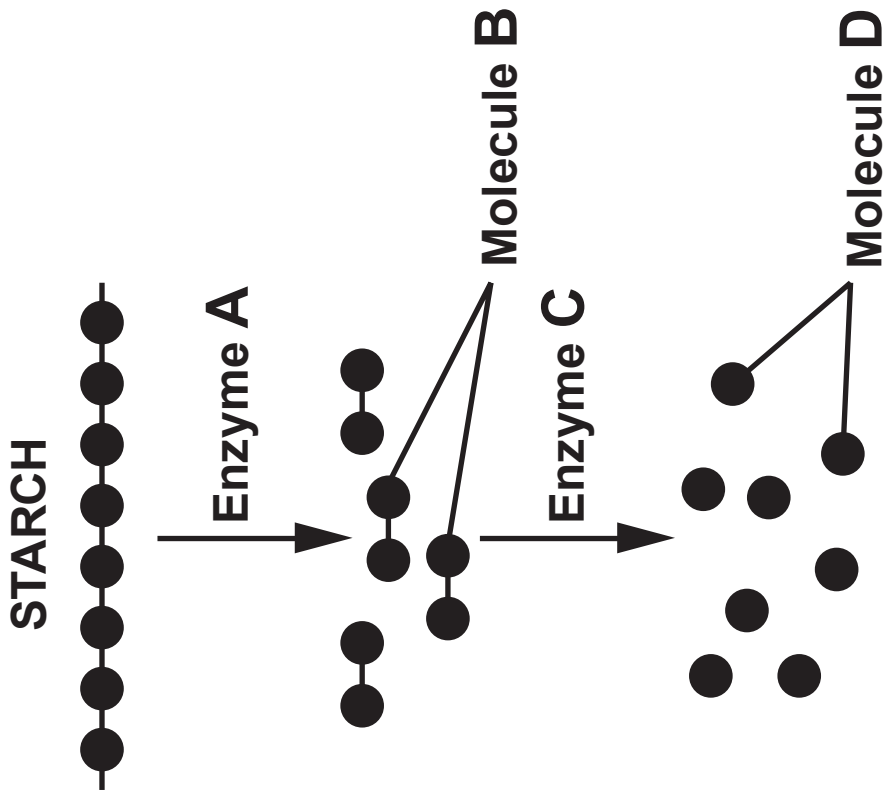
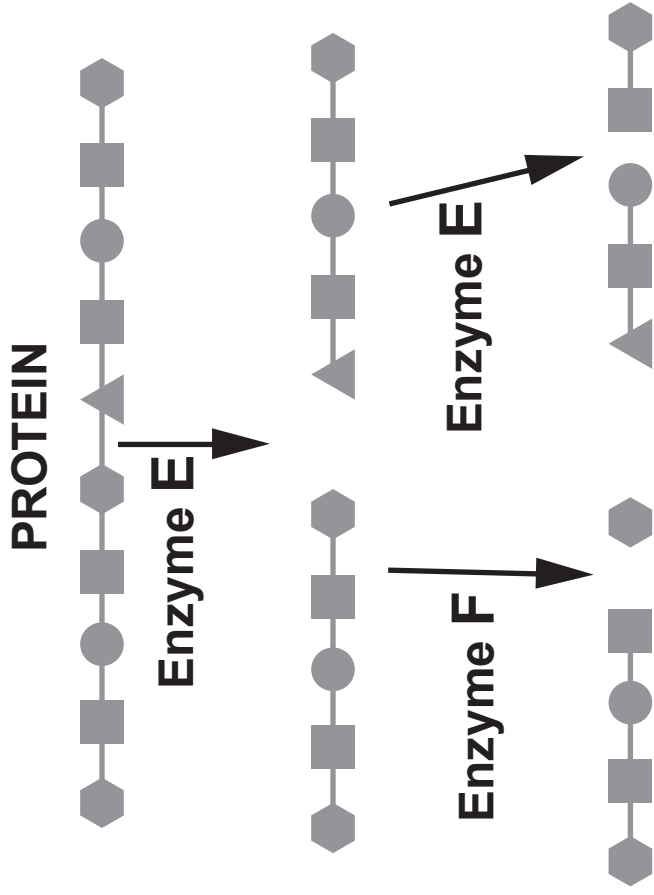
4. Digestion involves the breaking down of food by a combination of mechanical and chemical processes.

(a) Describe TWO ways in which food is broken down MECHANICALLY in the human alimentary canal.

[2]

I. _____

II. _____



4(b) The diagrams opposite show the digestion of a molecule of starch and a molecule of protein.

(i) In the digestion of starch name:

Enzymes **A** and **C**: [1]

A _____

C _____

Molecules **B** and **D**: [1]

B _____

D _____

(ii) Name TWO places in the alimentary canal where digestion caused by enzyme **A** takes place. [1]

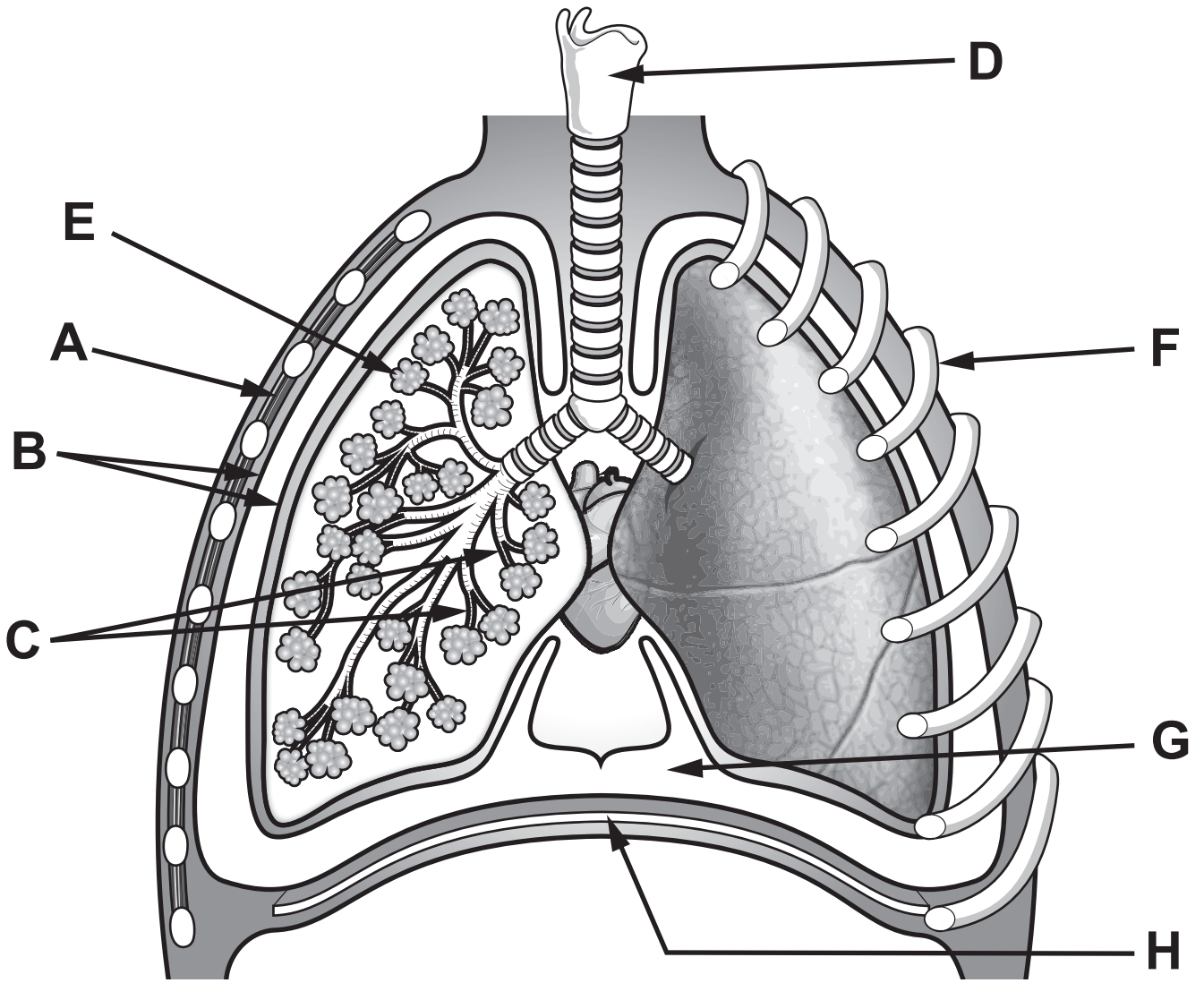
4(c) (i) In the digestion of protein name the **TYPES** of enzyme shown at **E** and **F**. [2]

E _____

F _____

(ii) Pepsin and trypsin are enzymes involved in the digestion of proteins. Both are secreted as inactive precursors. Complete the table to give the names of the substances responsible for their activation. [2]

Enzyme	Name of precursor	Activated by
pepsin	pepsinogen	
trypsin	trypsinogen	



5. The diagram opposite represents the human respiratory system.

(a) Use some of the letters from the diagram to match the structures to the following functions. [3]

FUNCTION	STRUCTURE
Flattens during inhalation to increase the volume of the thorax	
Become constricted and inflamed during an asthma attack	
Contain a surfactant to reduce surface tension	

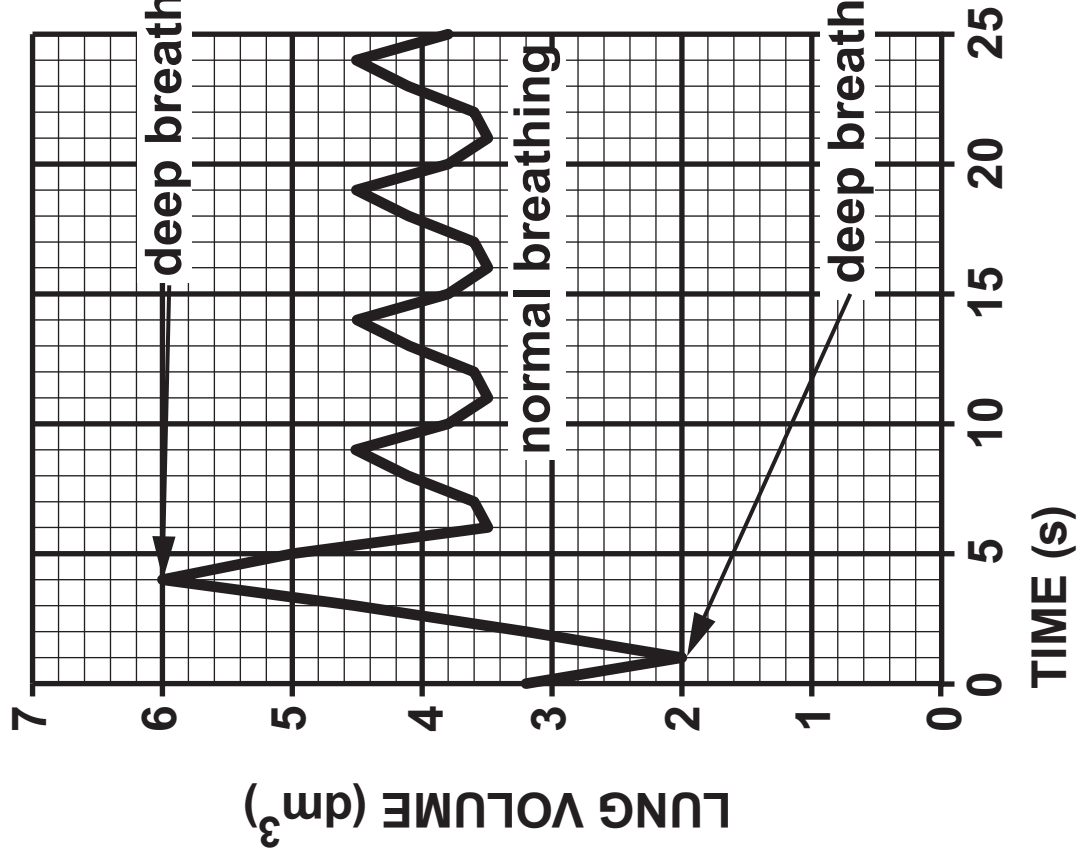
5(b) The structures labelled E have thin walls and are surrounded by an extensive capillary network.

Explain how these adaptations increase the efficiency of gas exchange. [3]

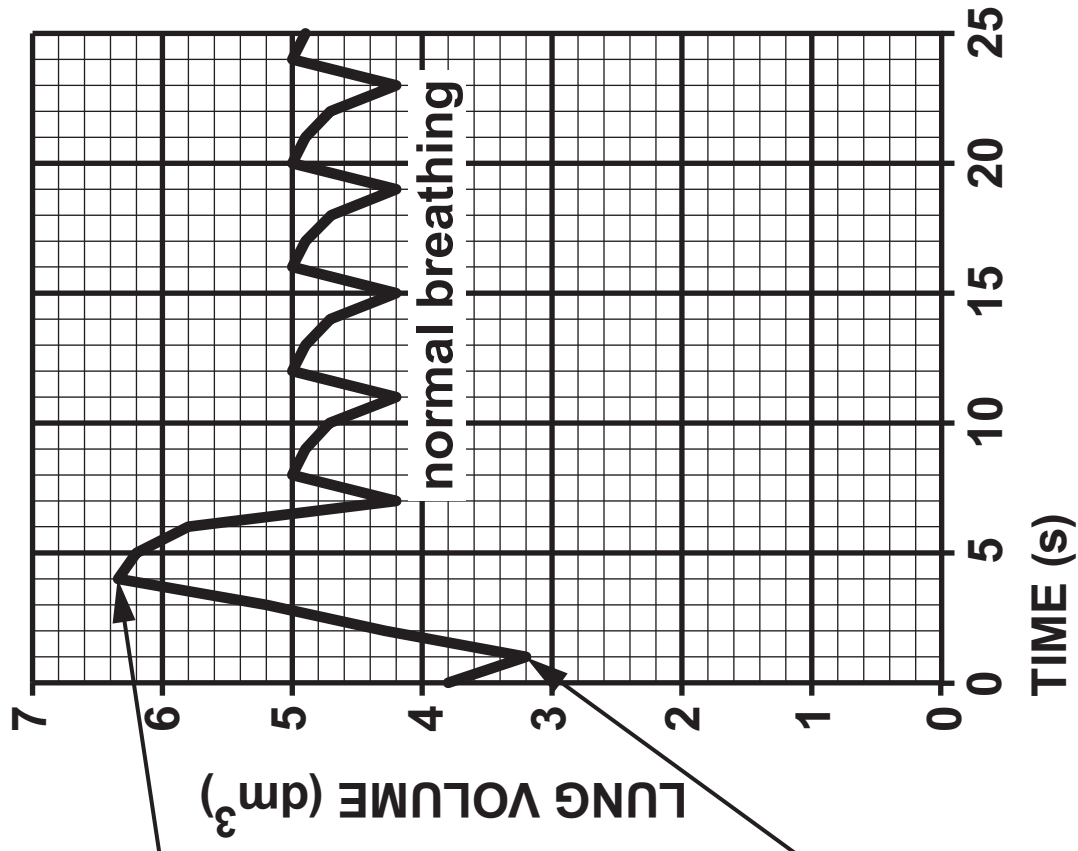
Thin walls _____

Extensive capillary network

Healthy person



Person with emphysema



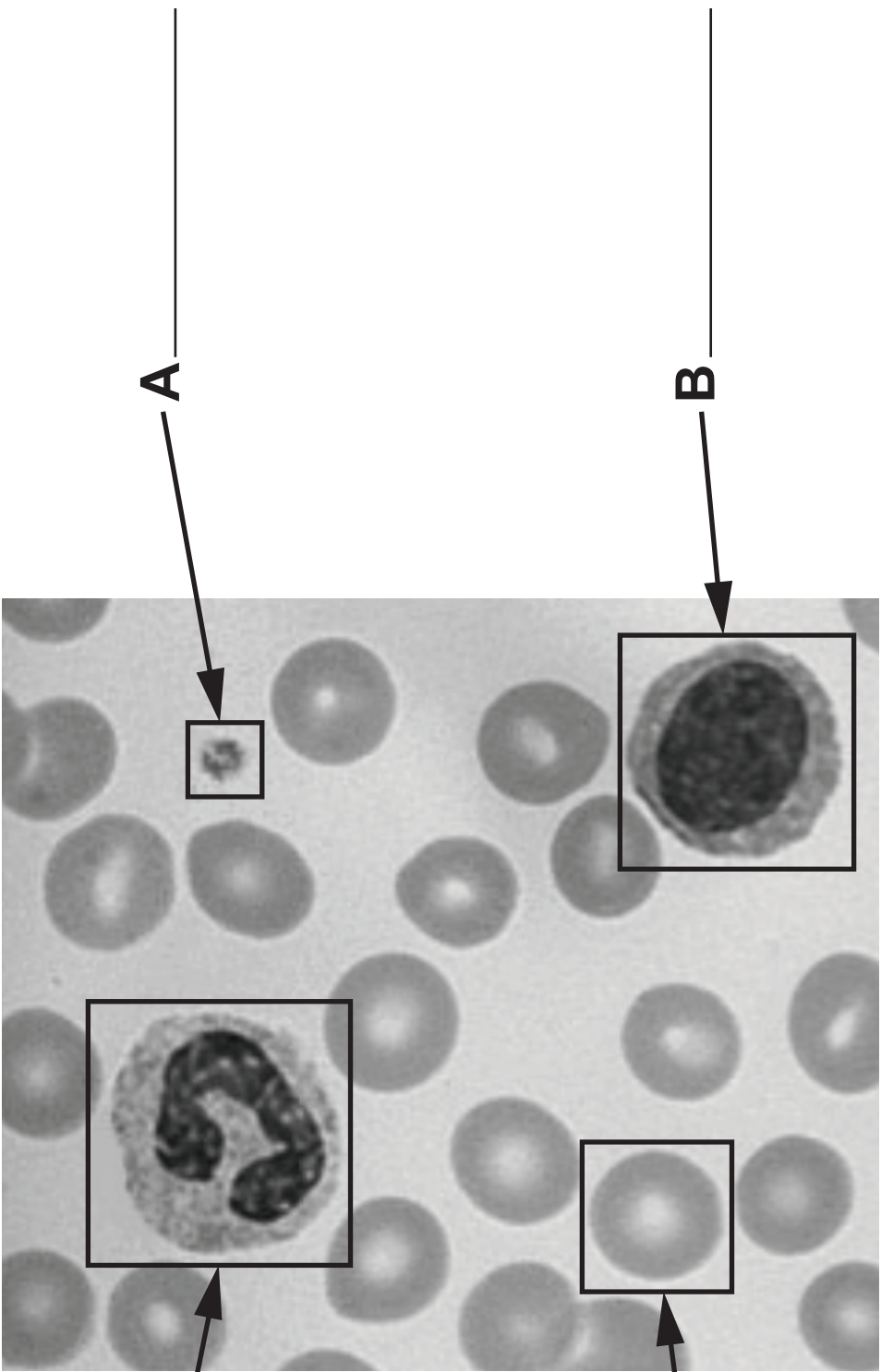
5(c) The graphs opposite show spirometer traces for a healthy person and a person with emphysema over the same time period.

(i) Using data from the graphs, describe how the breathing pattern of a person with emphysema differs from that of a healthy person. [3]

DEEP BREATH OUT

5(c) (i) DEEP BREATH IN

NORMAL BREATHING



A

B

D

C

6. The image opposite shows a smear of human blood.

(a) Label the components of blood identified on the image opposite. [2]

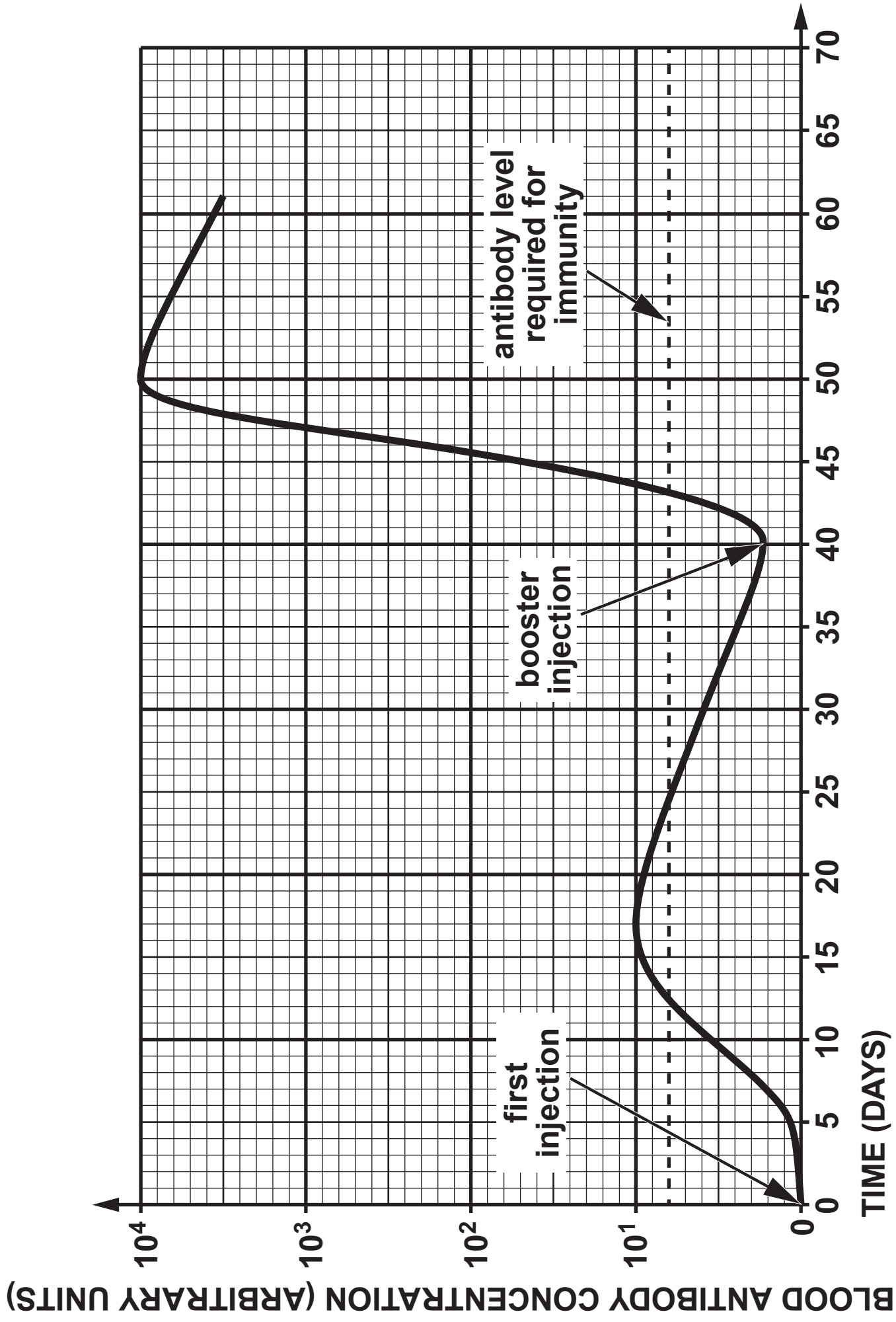
(b) (i) State the main function of the cell labelled C in the image. [1]

(ii) Describe and explain ONE adaptation shown by cell C that enables it to carry out this function. [2]

6(c) Identification of the antigens present on the cell membranes of these cells is used to place people into different blood groups.

(i) What is meant by the term ANTIGEN? [2]

(ii) Explain why it is important to identify a person's blood group correctly before giving that person a blood transfusion. [2]



7. The graph opposite shows how blood antibody concentration against Rubella changed in a 12 month old child following an injection with Rubella antigen at day 0 followed by a booster injection at day 40.

(a) (i) State the time taken to produce the antibody level required for immunity following the first injection with RUBELLA antigen. [1]

(ii) Explain why the time taken to produce the antibody level required for immunity was much shorter following the booster injection. [2]

7(b) The child, who had not been exposed to measles previously, was given a separate immunisation against the measles virus at Day 40 – the same day that she received the booster injection against RUBELLA.

(i) On the graph opposite page 22, draw a line to show how the blood antibody concentration against MEASLES changes from the immunisation at DAY 40 to DAY 60.

[3]

(ii) Explain why the blood antibody concentration against measles would change in this way. [2]

**8. Answer ONE of the following questions.
Any diagrams included in your answer must be fully annotated.**

EITHER,

- (a) (i) Describe how a single cardiac cycle is controlled in the human heart. [6]**
- (ii) Explain how an electrocardiogram can be used to diagnose problems in the control of the heartbeat. [4]**

OR.

- (b) (i) Describe the different ways in which antibiotics control the growth of bacteria. [6]**
- (ii) Explain how and why penicillin is more effective against Gram positive bacteria than Gram negative bacteria. [4]**
