

Surname	Centre Number	Candidate Number
Other Names		2



**GCE AS/A level**

1072/02

**HUMAN BIOLOGY – HB2**

P.M. WEDNESDAY, 18 January 2012

1½ hours

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	4	
2	14	
3	16	
4	12	
5	9	
6	5	
7	10	
<b>Total</b>	<b>70</b>	

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

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.

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1. The following statements describe some of the features of organisms in each of the five kingdoms.

Write the letter of the sentences **A** to **E** in the box that correctly identifies each of the five kingdoms.

- A** Eukaryotic organisms possessing cell walls and large vacuoles in their cells.
- B** Eukaryotic organisms that are non-photosynthetic but possess cell walls.
- C** Heterotrophic organisms showing nervous co-ordination.
- D** Unicellular organisms with no internal or nuclear membranes but possessing a cell wall.
- E** Small organisms possessing both internal and nuclear membranes.

[4]

Prokaryote

Protoctista

Fungi

Plantae

Animalia

**(Total 4 Marks)**

2. (a) Mammals have a double circulation.  
State what is meant by the term *double circulation* and explain its advantages to a mammal. [3]

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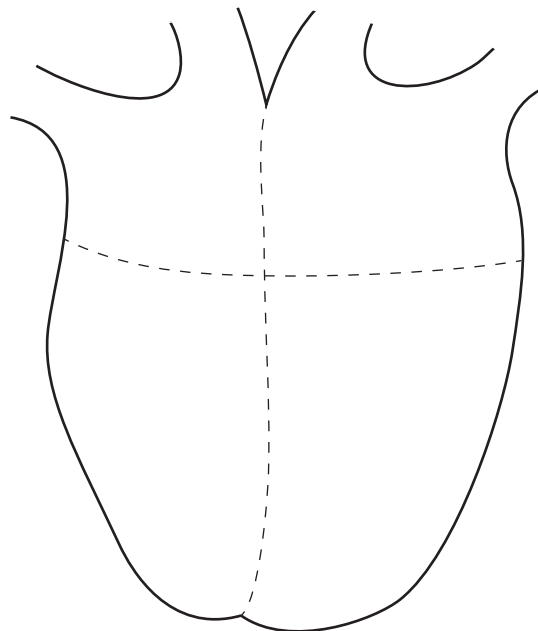
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- (b) The sino-atrial node (SAN), the atrio-ventricular node (AVN) and atrio-ventricular septum are tissues found in the heart. They are responsible for the initiation and control of the heartbeat.
- (i) In the outline of the heart below use labels with label lines to show the positions of the SAN and the AVN. [2]



- (ii) The atrio-ventricular septum is a thin layer of connective tissue between the atria and the ventricles.  
Explain the role of the atrio-ventricular septum and the AVN. [4]

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- (c) The SAN produces a wave of excitation every 800 milliseconds in a person at rest and a heartbeat is triggered each time. Calculate the rate of heartbeat per minute of the person at rest. Show your working. [2]

Answer .....

- (d) Explain how atherosclerosis of the coronary artery could lead to a heart attack. [3]

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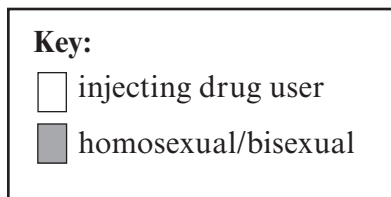
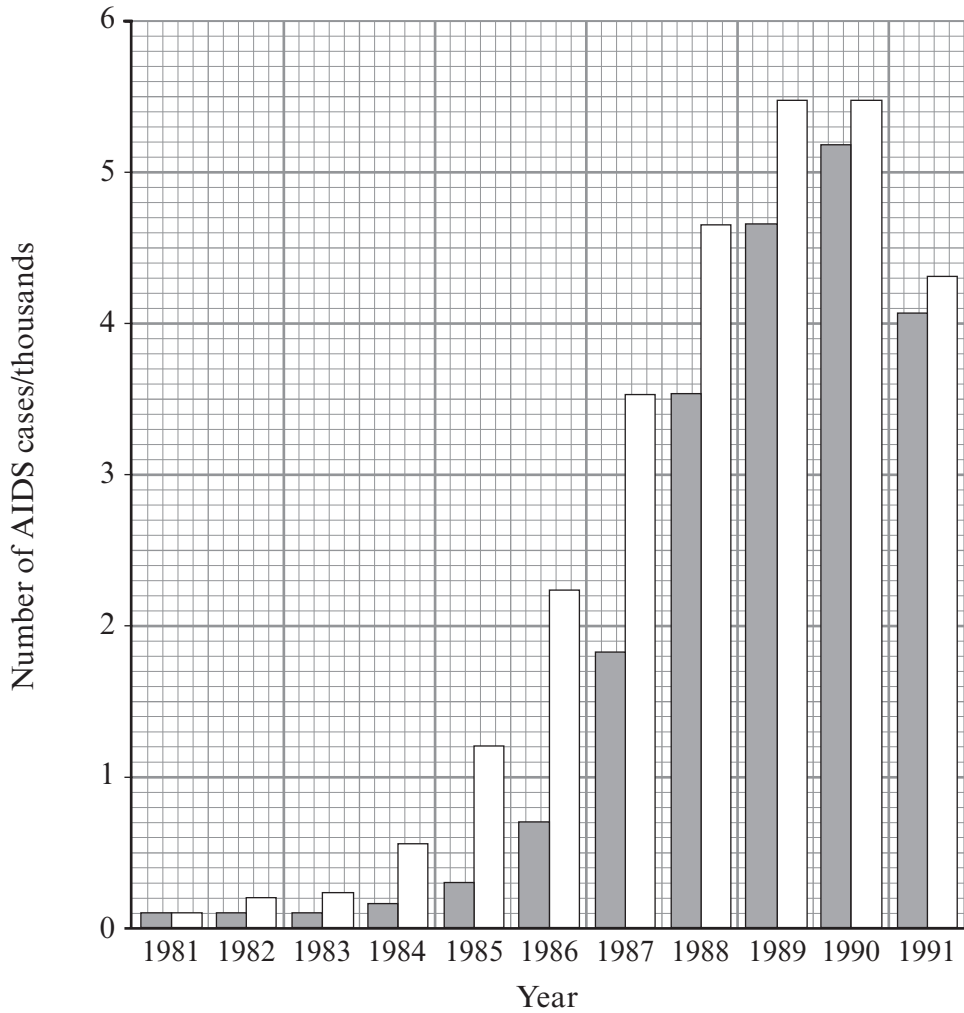
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**(Total 14 Marks)**

3. (a) The graph shows the number of cases of AIDS between the years 1981 to 1991 in two groups of males, those who are homosexual/bisexual and injecting drug users.



- (i) Describe the trends shown by the graph between 1981-1990. [3]

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(ii) Suggest reasons for the decline in the number of cases of AIDS between 1990 and 1991. [3]

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(b) Explain why a person who is HIV positive may not have AIDS. [3]

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(c) Explain why AIDS cannot be treated by using antibiotics. [2]

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(d) Suggest why it has not been possible to develop a vaccine for AIDS. [2]

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(e) Many people who develop AIDS die from other conditions that are normally non-fatal. Explain why these conditions become fatal for people with AIDS. [3]

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**(Total 16 Marks)**

4. (a) A spirometer is used to measure the volume of air breathed in and out of the lungs. A student breathes through a length of tubing connected to an air chamber, the expired air passing through a container of soda lime. As the student breathes in and out the chamber moves up and down and a pen attached to the chamber will record its movements.

(i) Explain why expired air should pass through soda lime before re-entering the air chamber. [2]

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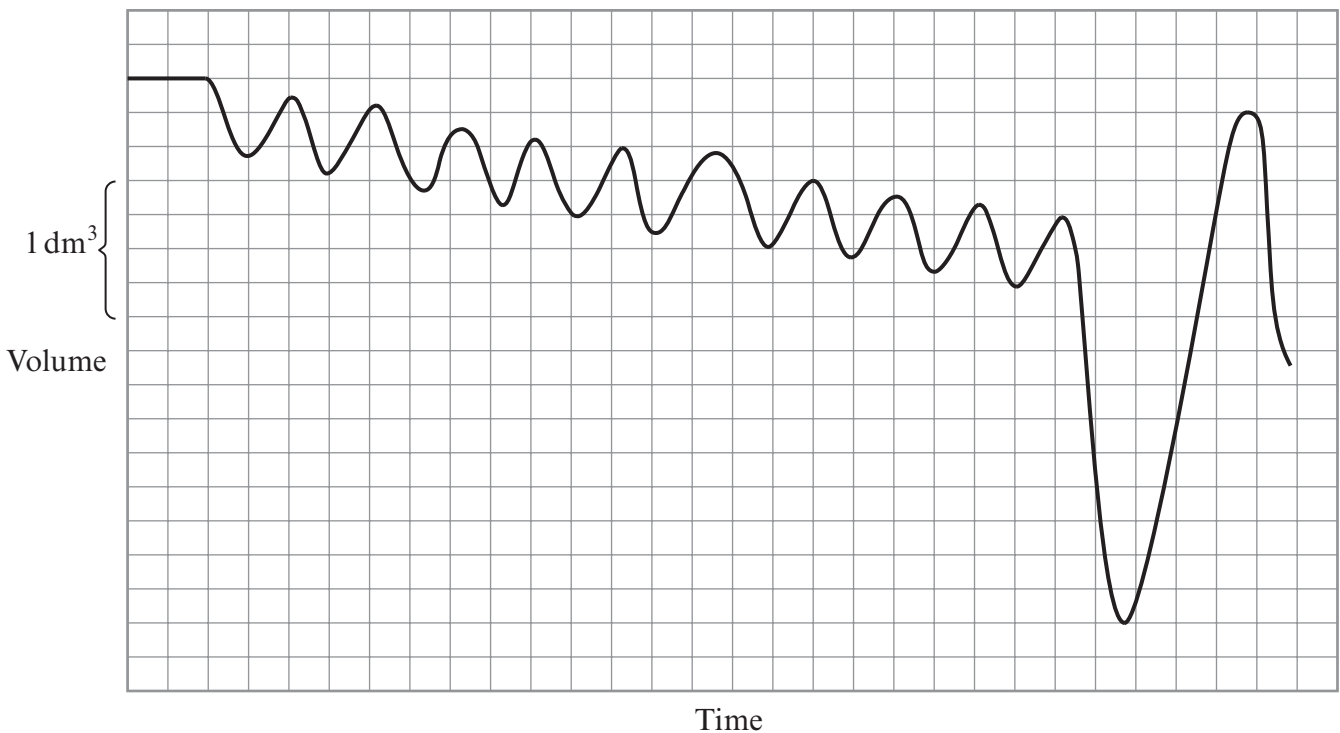
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(ii) State a safety precaution that should be taken before the next student uses the spirometer. [1]

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(b) The diagram shows a spirometer trace produced by a student who was at rest and then took a deep breath.



(i) Use the trace to determine the student's [2]

tidal volume; .....

vital capacity. ....



(ii) Explain why only some of the air breathed in during each breath reaches the gaseous exchange surface. [2]

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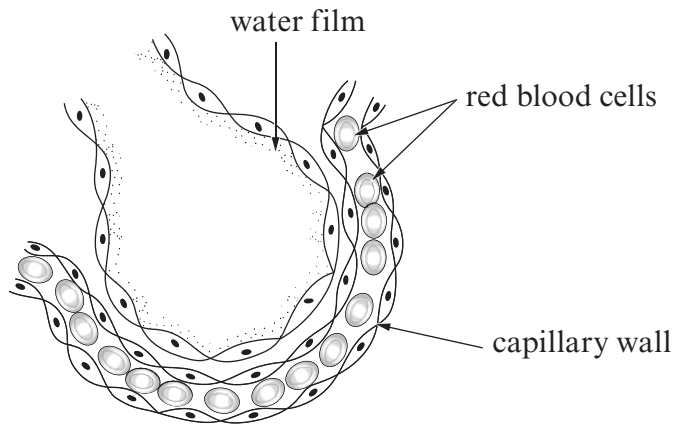
(c) Suggest why the spirometer is not a suitable piece of apparatus to measure the total lung volume. [2]

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(d) The diagram shows a human alveolus.



(i) Explain the function of a surfactant. [2]

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(ii) Premature babies lack a surfactant and lack energy. Explain why such babies lack energy. [1]

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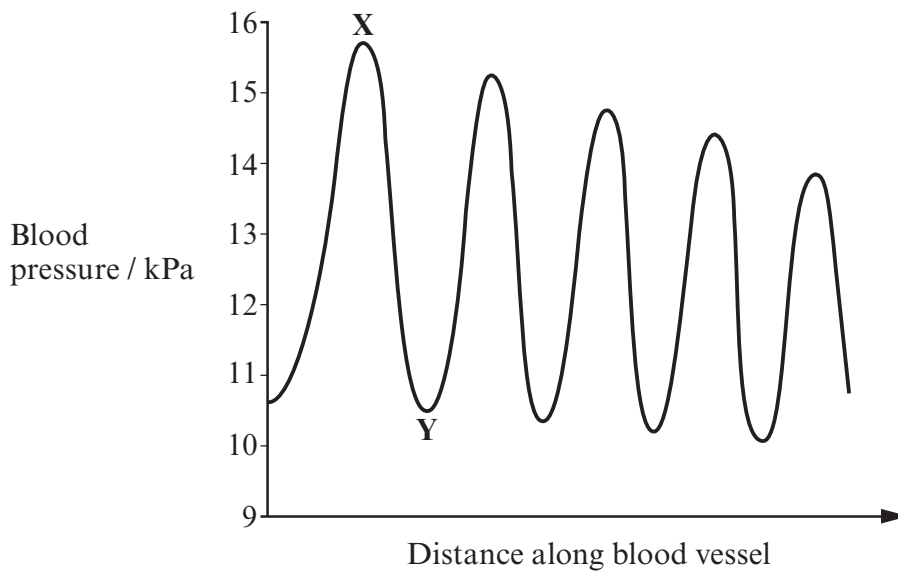
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**(Total 12 Marks)**

5. (a) List **four** ways in which arteries differ in structure from veins. [4]

1. ....
2. ....
3. ....
4. ....

(b) The diagram shows the blood pressure measured at different points along one blood vessel in the human circulatory system.



(i) Name the **type** of blood vessel in which the measurements were made. [1]

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(ii) Explain the difference in blood pressure between **X** and **Y**. [2]

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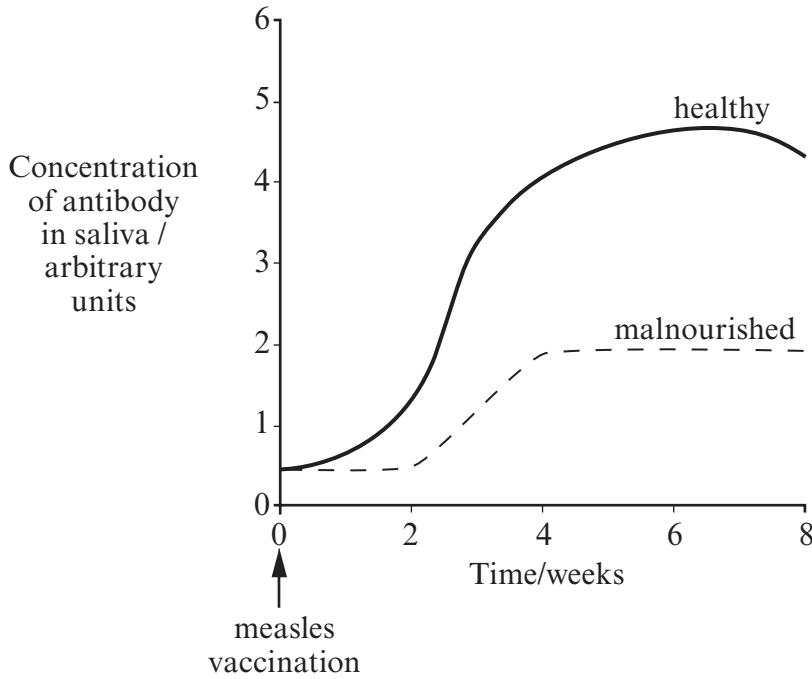
(iii) Explain the overall decrease in the **maximum** blood pressure. [2]

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6. (a) Large numbers of children continue to die from measles. Children may now be vaccinated against measles. The effectiveness of the vaccine varies according to diet. The graph shows the level of antibody in a well fed child and a malnourished child over a period of eight weeks from the point of vaccination.



- (i) Describe the differences between the graph antibody concentration for the 'healthy' and 'malnourished' child. [3]

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- (ii) Suggest why there is a difference in the response for a malnourished child. [2]

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**(Total 5 Marks)**





