Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						7	0	4	2	/	0	1	Signature	

Paper Reference(s)

7042/01

Examiner's use only

Team Leader's use only

London Examinations GCE

Human Biology

Ordinary Level

Paper 1

Monday 21 January 2008 – Morning

Time: 1 hour 15 minutes

Materials required for examination
Ruler

Items included with question papers
Nil

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total	

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
Check that you have the correct question paper.
Answer ALL questions.
Write your answers in the spaces provided in this question paper.

Information for Candidates

Calculators may be used.
The total mark for this paper is 100.
The marks for parts of questions are shown in round brackets: e.g. **(2)**.
This paper has 9 questions. All blank pages are indicated.

Advice to Candidates

Write your answers neatly and in good English.
In calculations, show **all** the steps in your working.

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Turn over

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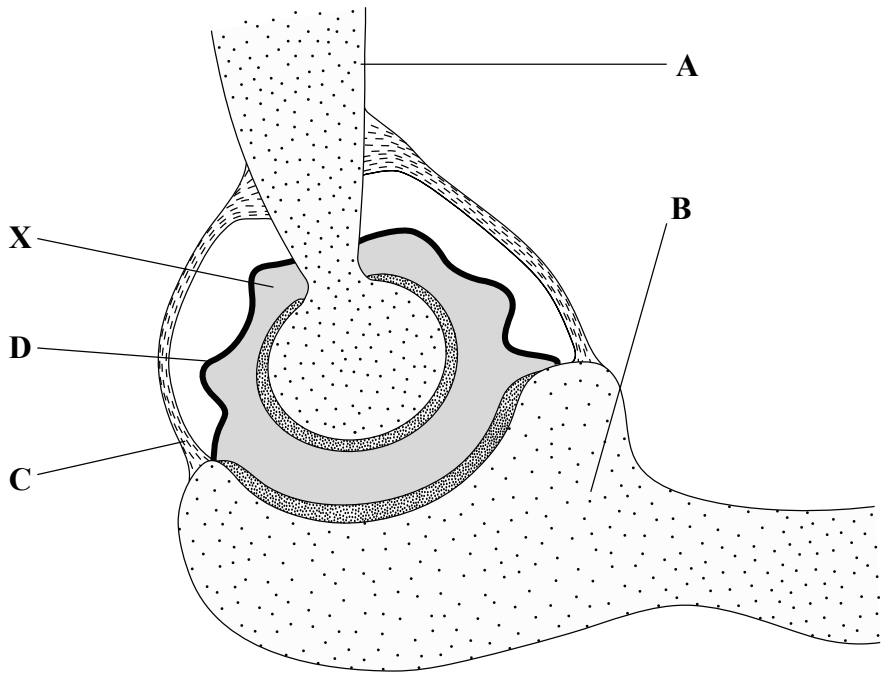
Leave blank

1. The diagram below shows two bones forming the elbow joint of a person.



(a) (i) Name the parts labelled **A**, **B**, **C** and **D**.

A .....

B .....

C .....

D .....

(4)

(ii) Name the type of joint shown in the diagram.

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(1)

(iii) Describe the function of the fluid labelled **X**.

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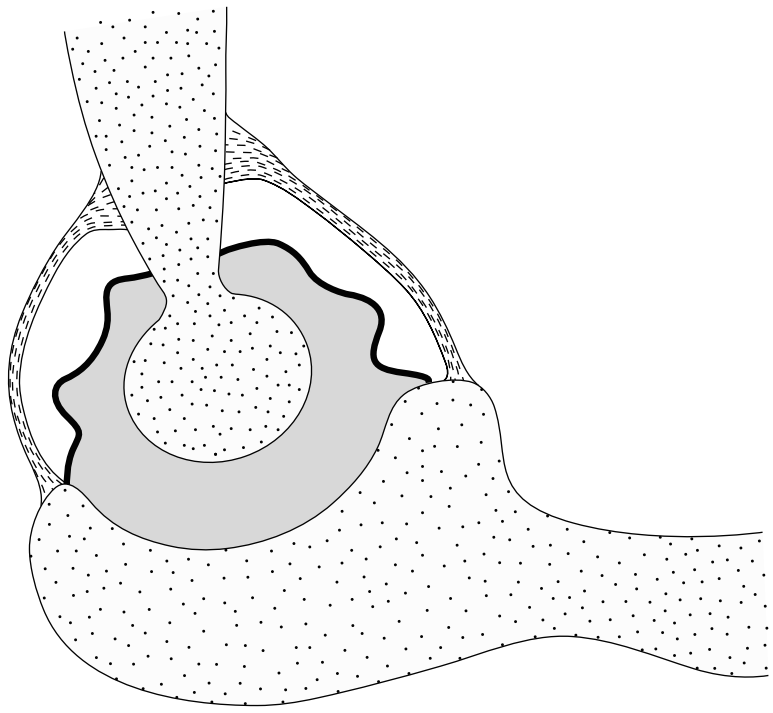
(2)

Leave blank

(b) Explain why the person whose elbow is shown in the diagram below is likely to have painful and difficult movement of the joint.



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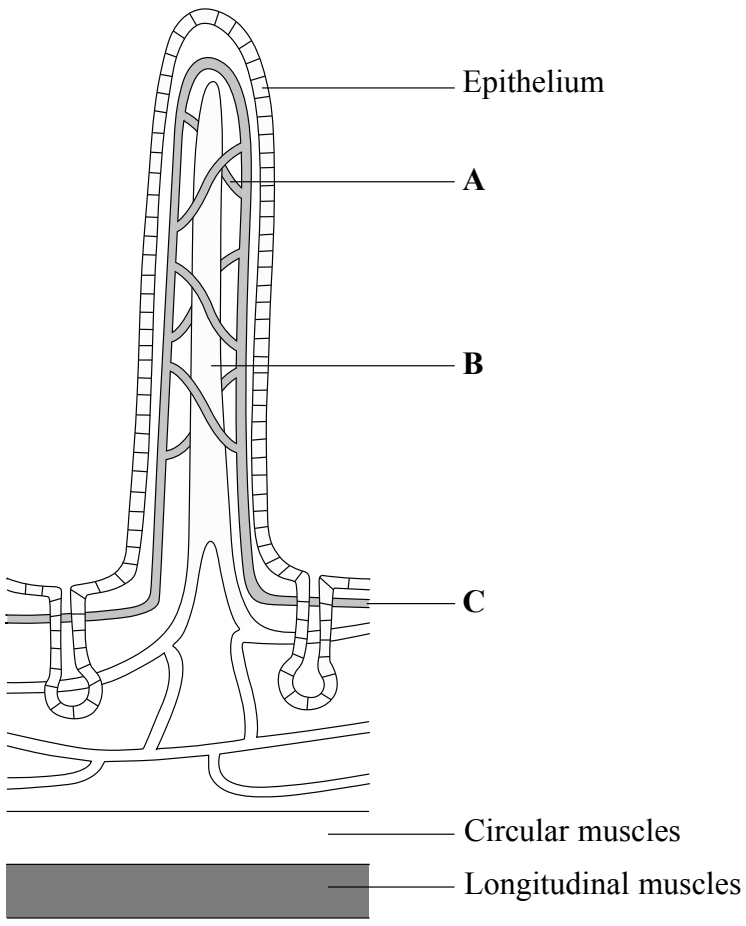
(4)

Q1

(Total 11 marks)

Leave blank

2. The diagram below shows a structure found in the alimentary canal.



(a) (i) Name this structure.

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(1)

(ii) Name the region of the alimentary canal where these structures are found.

.....

(1)

(b) There are many millions of these structures and they absorb digested food.

(i) Name **two** products of digestion that are absorbed into vessel **A**.

1 .....

2 .....

(2)

(ii) Name **one** product of digestion that is absorbed into vessel **B**.

.....

(1)

Leave blank

(c) Explain how each of the following helps in the absorption of the products of digestion.

(i) The large numbers of the structures named in (a)(i)

.....

.....

.....

(1)

(ii) The epithelium, made up of one layer of cells

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(1)

(d) Vessel **C** empties its contents into a vein. Name the organ that the blood in this vein reaches first.

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(1)

(e) How do the circular and longitudinal muscles help in the process of absorption?

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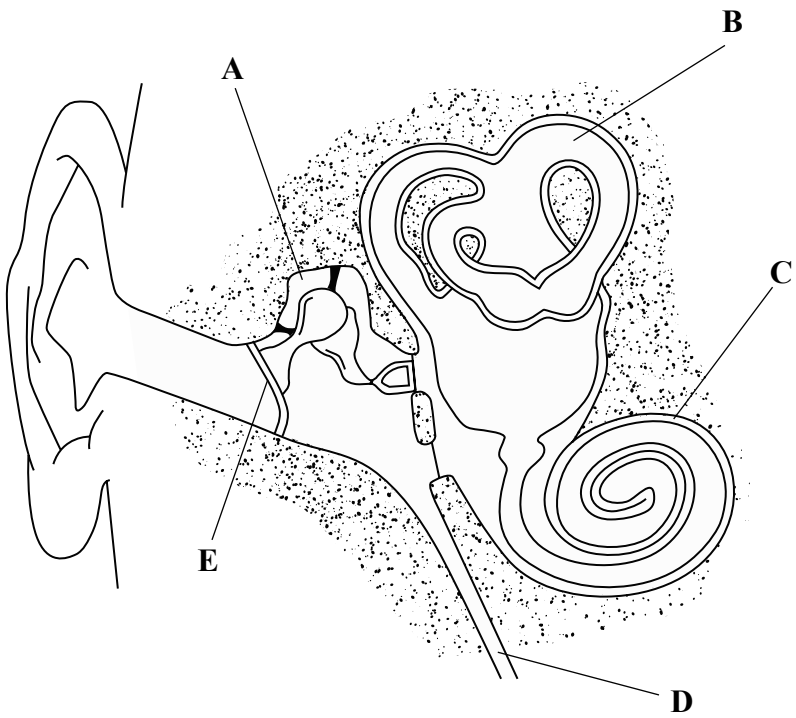
(2)

Q2

(Total 10 marks)

Leave blank

3. The diagram below shows a section through the ear.



(a) Certain parts of the ear contain air, whilst other parts contain fluid.

In the table below place a tick (✓) in the correct box to show whether each part contains air or fluid.

Part	Air	Fluid
A		
B		
C		

(3)

(b) Part **E** is a membrane that vibrates.

On the diagram, show the position of **two** other membranes that vibrate by labelling each with an arrow and the letter **V**.

(2)

Leave blank

(c) (i) On the diagram, label with the letter **X** the part of the ear that detects sound.

(1)

(ii) On the diagram, label with the letter **Y** one part of the ear that is responsible for balance.

(1)

(d) Explain why it is more difficult to hear when part **D** becomes blocked as a result of suffering from a common cold.

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(4)

Q3

(Total 11 marks)

Leave blank

4. The quantities of certain substances were measured in different parts of the kidney tubule over a period of 24 hours. The measurements were made in the blood plasma of the glomerulus, in the filtrate of the Bowman's capsule and in the urine.

The results are shown in the table below.

Substance	**Blood plasma of glomerulus in g per day**	**Filtrate of Bowman's capsule in g per day**	**Urine in g per day**
Water	180 000	180 000	1500
Proteins	8 000	0	0
Glucose	180	180	0
Uric acid	8.5	8.5	0.8
Urea	53	53	25

(a) Use the information in the table to answer the following questions.

(i) Calculate the percentage of water that is removed in the urine from the filtrate in the Bowman's capsule. Show your working.

Answer .....%
(2)

(ii) Name **one** substance that is not filtered by the Bowman's capsule.

.....
(1)

(iii) Name **one** substance that is completely reabsorbed by the kidney tubule.

.....
(1)

Leave blank

(b) How might the values for water change if the measurements had been carried out on a hot day? Explain your answer.

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(3)

(c) Urea is an excretory product of the body.

(i) How and where is urea produced in the body?

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(2)

(ii) How is the urea transported to the kidney?

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(2)

(iii) How do the figures in the table support the statement that urea is excreted from the body?

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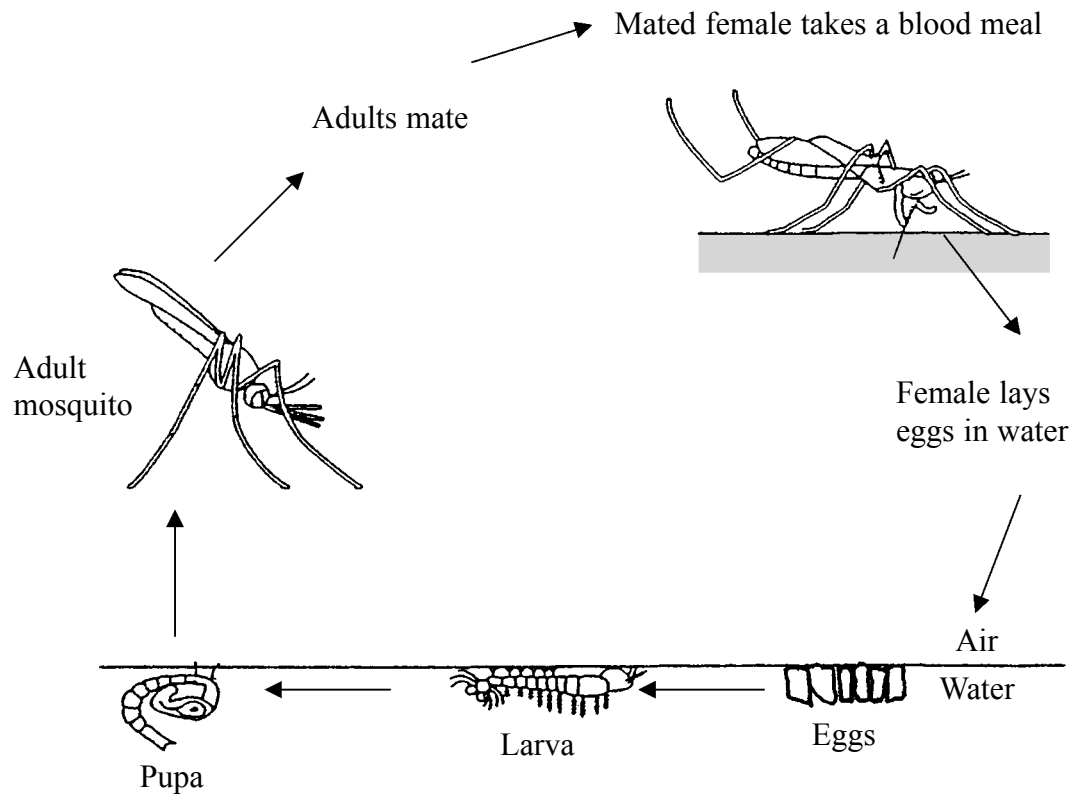
(2)

Q4

(Total 13 marks)

Leave blank

5. The diagram below shows an outline of the life cycle of the *Anopheles* mosquito. The mosquito is a vector of malarial parasite.



(a) (i) What is meant by the term **vector**?

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(2)

(ii) On the diagram, by means of a line labelled A, show where malaria is passed on to a human.

(1)

Leave blank

(iii) Give **two** stages of the life cycle where control measures could be used to stop the spread of the malarial parasite. In each case, explain how the control measure would be effective.

Stage .....

Explanation .....

.....

.....

Stage .....

Explanation .....

.....

.....

(4)

(b) Suggest **two** reasons why malaria is a difficult disease to control.

1 .....

.....

2 .....

.....

(2)

(c) There is evidence that an increase in global temperatures is occurring. Suggest the possible effects of increases in global temperature on the number of cases of malaria.

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(2)

Q5

(Total 11 marks)

Leave blank

6. (a) Read the passage below about the transmission of a nerve impulse. Write on the dotted lines the most suitable word or words to complete the account.

Nerve impulses pass along an axon in the form of an ..... impulse. Nerve cells come very close to the ends of other nerve cells at gaps called ..... . Nerve impulses are able to pass across these gaps because of chemical substances. These substances are known as ....., an example of which is acetylcholine.

The impulse reaches a pre-synaptic membrane, which is separated from the post-synaptic membrane by a small gap. The acetylcholine is formed at the end of the pre-synaptic axon and is contained in ..... . When the acetylcholine is released, it moves from the pre-synaptic membrane to the post-synaptic membrane by ..... and then ..... another impulse.

(6)

(b) Suggest why the release of acetylcholine requires large numbers of mitochondria to be present in the pre-synaptic axon.

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(2)

Q6

(Total 8 marks)

Leave blank

7. Body Mass Index (BMI) is a measure that can be used to judge if a person's weight is within normal limits, or if they are underweight or obese.

The BMI for a person can be calculated using the following equation

$$\text{BMI} = \frac{\text{body mass in kg}}{(\text{height in metres})^2}$$

The table below gives descriptions that interpret different BMI values.

BMI	Description
Under 20	Underweight
20 to 24	Acceptable
25 to 30	Overweight
Greater than 30	Obese

(a) Use this information to determine whether a woman who weighs 75 kg and whose height is 1.5 m is obese. Show your working.

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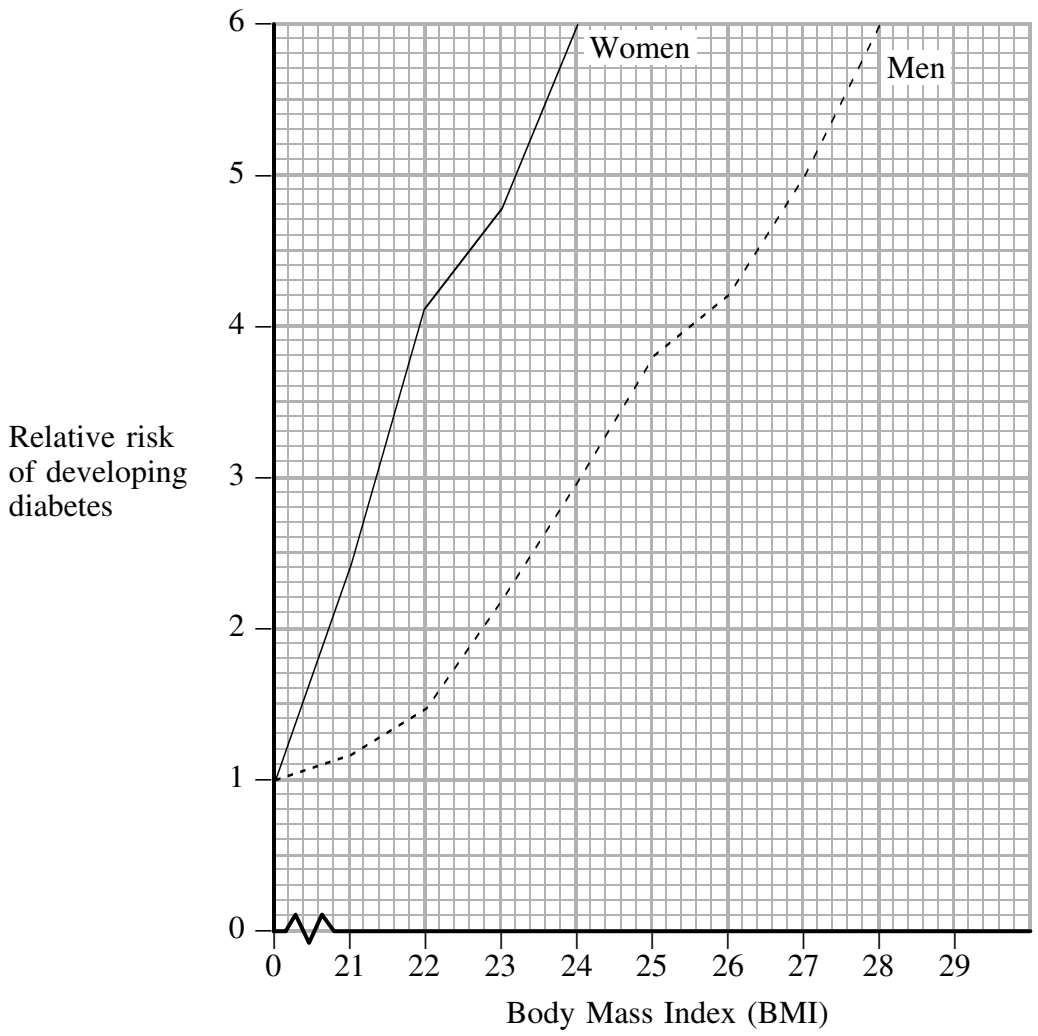
(3)

Leave blank

(b) The diagram below shows how changes in BMI affect the risk of developing diabetes in women and in men.



Describe how increasing BMI affects the relative risk of diabetes in women and in men.

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(3)

Leave blank

(c) (i) Presence of glucose in the urine is one of the symptoms of diabetes. Glucose is a reducing sugar.

Describe how you could test a sample of urine for the presence of glucose.

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(3)

(ii) Name the hormone that is deficient in someone suffering from diabetes.

.....

(1)

(d) Suggest **one** other condition for which there is an increased risk in obese people.

.....

(1)

Q7

(Total 11 marks)

Leave blank

8. Haemoglobin exists in two forms, normal haemoglobin and sickle cell haemoglobin.

The allele for normal haemoglobin is Hb and that for sickle cell haemoglobin is Hb^S. The alleles are codominant.

(a) (i) State what is meant by the term **genotype**.

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.....

(1)

(ii) State what is meant by the term **codominant**.

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(2)

(b) (i) A person with the allele Hb^S is resistant to malaria.

Complete the table below, to show the possible genotypes of children born to two sets of parents in different families with genotypes given. For each child, state whether this genotype would be resistant to malaria or not. Part of the table has been completed for you.

Genotype of parents		**Possible genotypes of children**	**Resistant to malaria Yes/No**
Father	**Mother**		
$HbHb^S$	$HbHb^S$	HbHb	no
HbHb	$HbHb^S$	HbHb	no

(6)

(ii) Parents who have particular genotypes can produce children who all have resistance to malaria, but none of the children suffers from sickle cell anaemia.

State the genotypes of such parents.

Parent 1 .....

Parent 2 .....

(2)

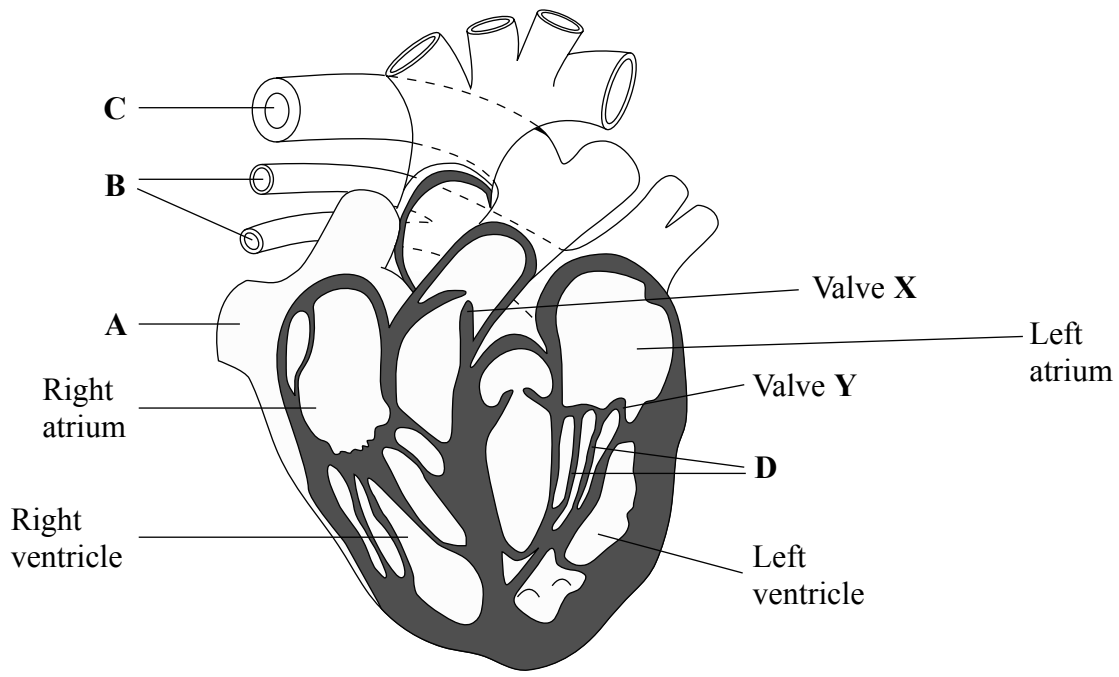
(Total 11 marks)

Leave blank

Q8

Leave blank

9. The diagram below shows a section through the heart with certain parts labelled.



(a) Name parts **A**, **B**, **C** and **D** and give the function of each part.

Write your answers in the table below.

Part	Name of part	Function
A		
B		
C		
D		

(8)

Leave blank

(b) (i) **X** and **Y** are different types of valve. Give the function of valves.

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.....

.....

(1)

(ii) Where in the circulatory system, other than in the heart, are valves found?

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(1)

(c) (i) Which side of the heart contains oxygenated blood?

.....

(1)

(ii) The walls of the left ventricle are thicker than those of the right ventricle. Explain the importance of this difference.

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(3)

Q9

(Total 14 marks)

TOTAL FOR PAPER: 100 MARKS

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