Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						4	3	2	5	/	2	H	Signature	

Paper Reference(s)

4325/2H

Examiner's use only

Team Leader's use only

London Examinations IGCSE

Biology

Paper 2H

Higher Tier

Thursday 8 November 2007 – Morning

Time: 2 hours

Question Number	Leave Blank
1	
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Total	

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
The paper reference is shown at the top of this page. Check that you have the correct question paper.
Answer **ALL** the questions in the spaces provided in this question paper.
Show all the steps in any calculations and state the units.
Calculators may be used.

Information for Candidates

The total mark for this paper is 120. The marks for parts of questions are shown in round brackets: e.g. **(2)**.
There are 28 pages in this question paper. All blank pages are indicated.

Advice to Candidates

Write your answers neatly and in good English.

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Answer ALL the questions. Write your answers in the spaces provided.

1. Living organisms have certain characteristics in common. The table gives descriptions of some of these characteristics.

Complete the table by filling in the gaps.

Characteristic	Description
moving	not staying in the same place
excreting	
	increasing in size and mass
	getting energy from food
reproducing	

Q1

(Total 4 marks)

Leave blank

2. (a) Substances move into and out of cells by different methods.

Three methods, **A**, **B** and **C**, are described below.

A movement of substances against a concentration gradient

B movement of water from a dilute solution to a more concentrated solution through a partially permeable membrane

C movement of substances down a concentration gradient

Complete the table by putting the correct letter for each method.

Method	Letter of description
diffusion	
osmosis	
active transport	

(3)

(b) Complete the sentences below by writing a correct word or phrase in the blank spaces.

(i) An example of diffusion in the lung of a mammal involves a substance called oxygen, which moves from the ..... to the ..... .

(2)

(ii) An example of osmosis in the kidney of a mammal involves a substance called ..... , which moves from the nephron to the ..... .

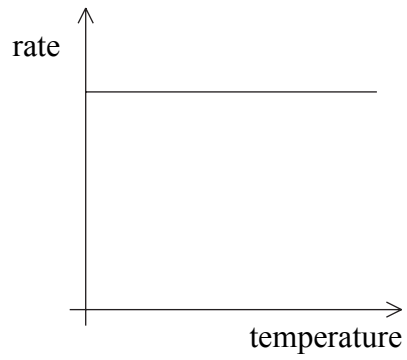
(2)

(iii) An example of active transport in a flowering plant involves uptake of a mineral salt, which moves from the ..... to the ..... in a root hair cell.

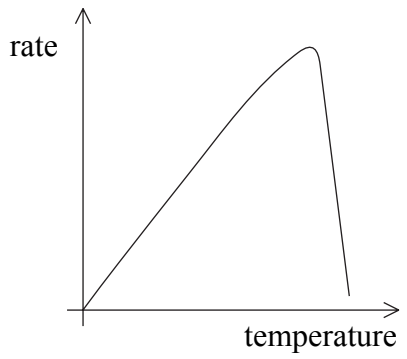
(2)

Leave blank

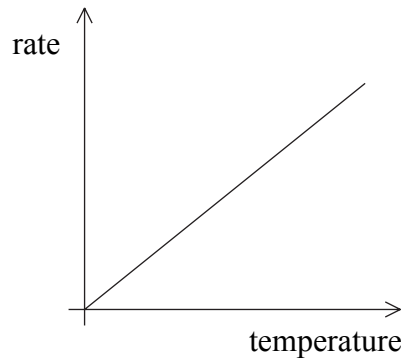
(c) The graphs show the effect of changing the temperature on the rate of movement of substances into cells.



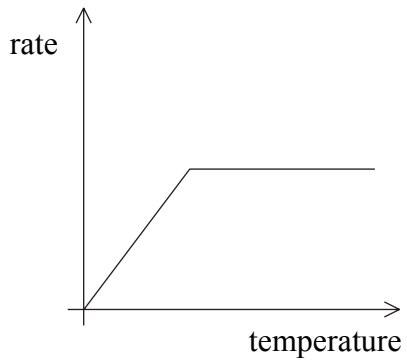
A



B



C



D

(i) Which graph shows the effect of temperature on diffusion?

.....

(1)

(ii) Which graph shows the effect of temperature on active transport?

.....

(1)

Q2

(Total 11 marks)

Leave blank

3. A habitat is a place where organisms live. The food chains below are from different habitats.

From a seashore

seaweed → periwinkle (a mollusc) → oystercatcher (a bird)

From the edge of a field

blackberry (a fruit) → bank vole (a mammal) → tawny owl (a bird)

(a) (i) Name **one** primary consumer in these food chains.

.....

(1)

(ii) What is the original energy source for these food chains?

.....

(1)

(b) The following food chains come from a woodland environment.

leaf litter → earthworm → blackbird → sparrow hawk

dead mouse → blowfly larvae → common frog → grass snake

Other than the names of the organisms, give **two** ways in which these food chains differ from the examples in part (a).

1 .....

.....

2 .....

.....

(2)

Leave blank

(c) (i) Name **two** groups of organisms that can act as decomposers in food chains.

1 .....

2 .....

(2)

(ii) Describe the role of decomposers in the carbon cycle.

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(3)

Q3

(Total 9 marks)

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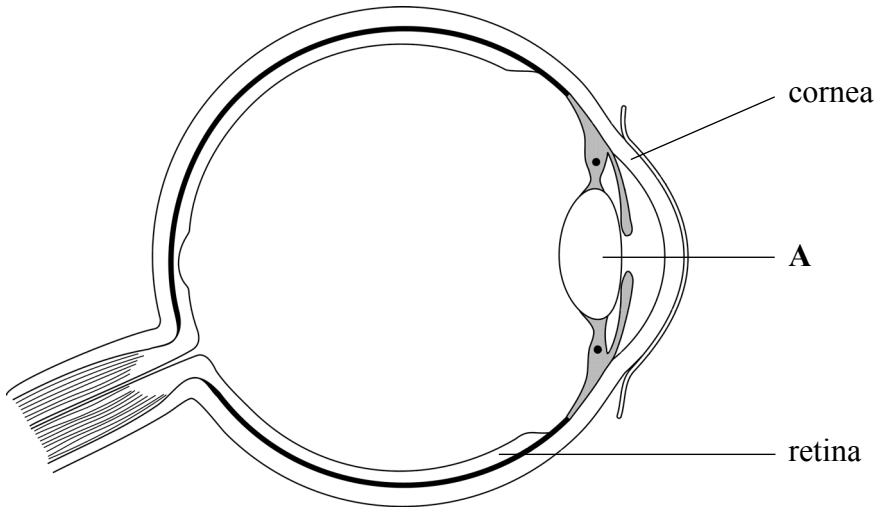
4. The diagram shows a section of the human eye.



(a) Name the part labelled **A**.

.....

(1)

(b) Some people have a rare genetic condition that makes the cornea become cloudy. As a result they find it difficult to see clearly and may become blind.

(i) Suggest why a cloudy cornea makes it difficult for a person to see clearly.

.....

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(2)

Leave blank

(ii) The condition for cloudy cornea is caused by a dominant allele **N**. The recessive allele, **n**, results in a clear cornea.

A couple plan to have children. The father is heterozygous for cloudy cornea and the mother is homozygous recessive.

Complete the genetic diagram to show the genotypes of the parents, the gametes and the possible genotypes and phenotypes of their children. Use **N** for the dominant allele and **n** for the recessive allele.

	Father		**Mother**
Genotypes of parents	.....	and	.....
Gametes			
Genotypes of children			
Phenotypes of children			

(4)

(Total 7 marks)

Q4

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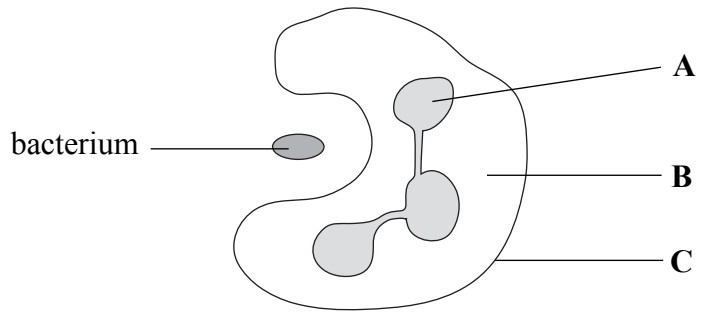
5. The diagram shows a white blood cell ingesting a bacterium.



(a) Complete the table to give the names and functions of the parts labelled **A**, **B** and **C**.

Letter	Name	Function
A		
B		
C		

(6)

(b) Describe what happens to the bacterium after it has been ingested by the white blood cell.

.....

.....

.....

.....

(2)

(c) Normal blood contains 7000 white blood cells per mm^3. A person with a mild infection had blood with 10 500 white blood cells per mm^3. Calculate the percentage increase in white blood cells. Show your working.

Answer .....

(2)

Q5

(Total 10 marks)

Leave blank

6. The technique of selective breeding can be used to produce a crop of tomato plants that flower early.

The table shows the steps taken to breed early-flowering tomato plants.

Complete the table by using numbers to show the correct order of the steps.

Step	Order of step
select early-flowering offspring plants	
allow seeds from early-flowering plants to grow	
select early-flowering plants	1
grow early-flowering offspring plants	5
repeat the process for several generations	
collect seeds from early-flowering plants	

(Total 4 marks)

Q6

Leave blank

7. Explain how growing crops in glasshouses can alter the yield of a crop.

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(Total 5 marks)

Q7

Leave blank

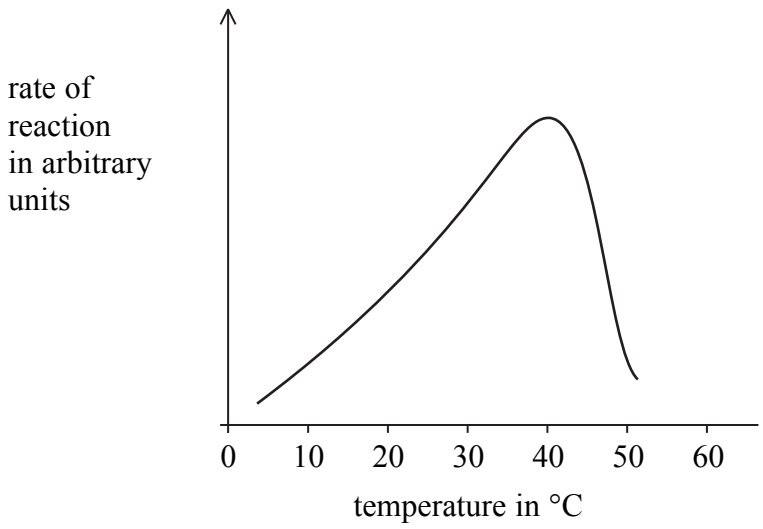
8. Some large molecules are made from smaller basic units.

(a) The table shows some important large molecules in living organisms. Complete the table to show the missing large molecule and the smaller basic units.

Large molecule	Smaller basic units
starch	
protein	
	fatty acids and glycerol

(3)

(b) Protein is broken down into its smaller units by a protease enzyme. The graph shows how the activity of a protease is affected by temperature.



Describe how the rate of reaction of this protease varies with temperature.

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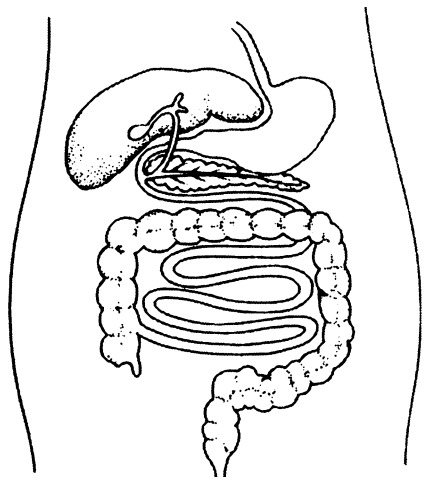
(2)

Q8

(Total 5 marks)

Leave blank

9. The diagram shows part of the human digestive system.



(a) On the diagram, use an arrow and the letter **L** to show the large intestine.

(1)

(b) On the diagram, use an arrow and the letter **B** to show where bile is made.

(1)

(c) Give **two** functions of bile.

1 .....

.....

.....

2 .....

.....

.....

(2)

Leave blank

(d) The products of digestion are absorbed by villi in the small intestine. Explain how the structure of villi helps absorption of these products.

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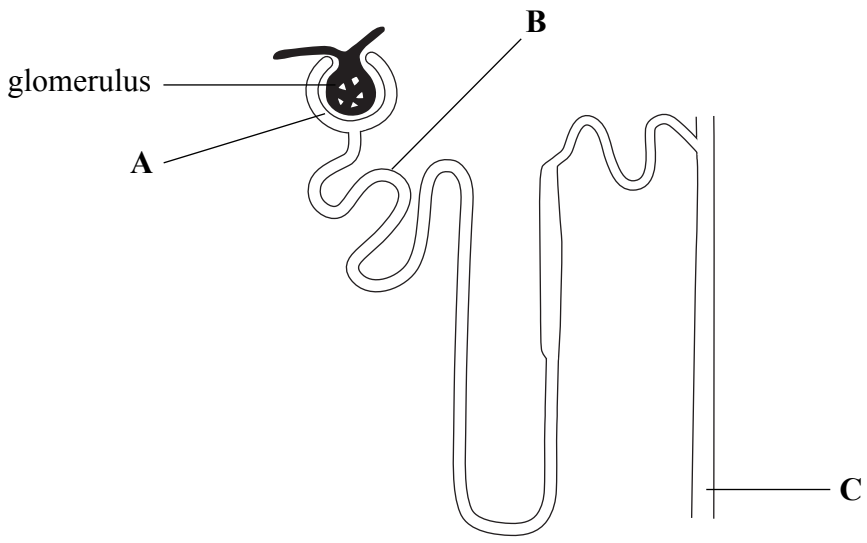
(2)

Q9

(Total 6 marks)

Leave blank

10. The diagram shows a nephron from a human kidney.



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

A .....

B .....

C .....

(3)

(ii) Ultrafiltration occurs between the glomerulus and part **A**. Explain what is meant by the term ultrafiltration.

.....

.....

.....

.....

(2)

Leave blank

(b) The table shows the concentrations of urea in part **A** and in part **C**.

Concentration of urea in g per 100 cm^3	
in part A	**in part C**
0.03	2.00

(i) How many times more concentrated is the urea in part **C** compared with part **A**?

.....

.....

(1)

(ii) Suggest why the concentration of urea is greater in part **C** than in part **A**.

.....

.....

(1)

(c) Some substances affect the secretion of ADH. These substances increase the production of urine and are known as diuretics. Suggest how diuretics increase the production of urine.

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(3)

Q10

(Total 10 marks)

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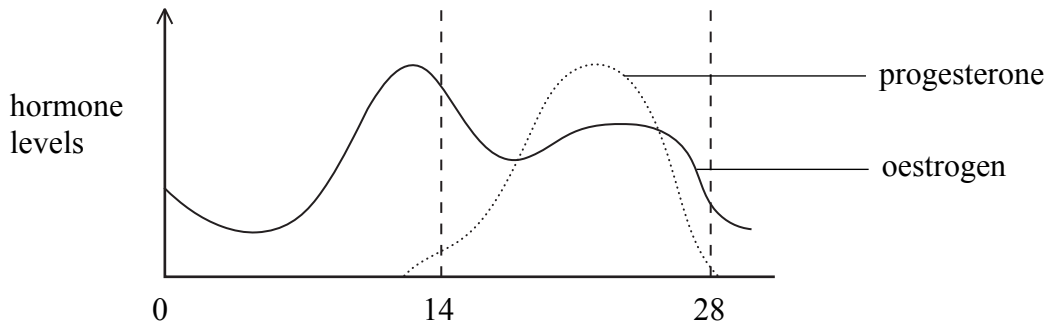
11. The diagram shows how the levels of oestrogen and progesterone vary in the menstrual cycle.



(a) On the diagram, show how the line for progesterone would change if the woman became pregnant.

(1)

(b) Fill in the missing words in the sentences below.

The fusion of a male and female gamete is known as fertilisation, which produces a single cell called a ..... This cell divides and develops into an ....., which is protected by ..... fluid in the uterus.

(3)

(c) Which type of reproduction involves gametes?

.....

(1)

Q11

(Total 5 marks)

Leave blank

12. Many scientists from the British Antarctic Survey work in the Antarctic. Sometimes the temperature can fall as low as –50 °C. Scientists who live there need lots of energy to work under such cold conditions.

(a) Name the process that releases energy in the cells of these scientists working in the Antarctic.

.....

(1)

(b) Complete the balanced chemical equation for the process that releases energy.

$C_6H_{12}O_6$ + ... → $6CO_2$ + ... + energy

(2)

(c) Explain why the scientists need lots of energy to work in these cold conditions.

.....

.....

.....

.....

(2)

(d) Describe and explain **one** way in which the skin helps in temperature regulation in cold conditions.

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(2) **Q12**

(Total 7 marks)

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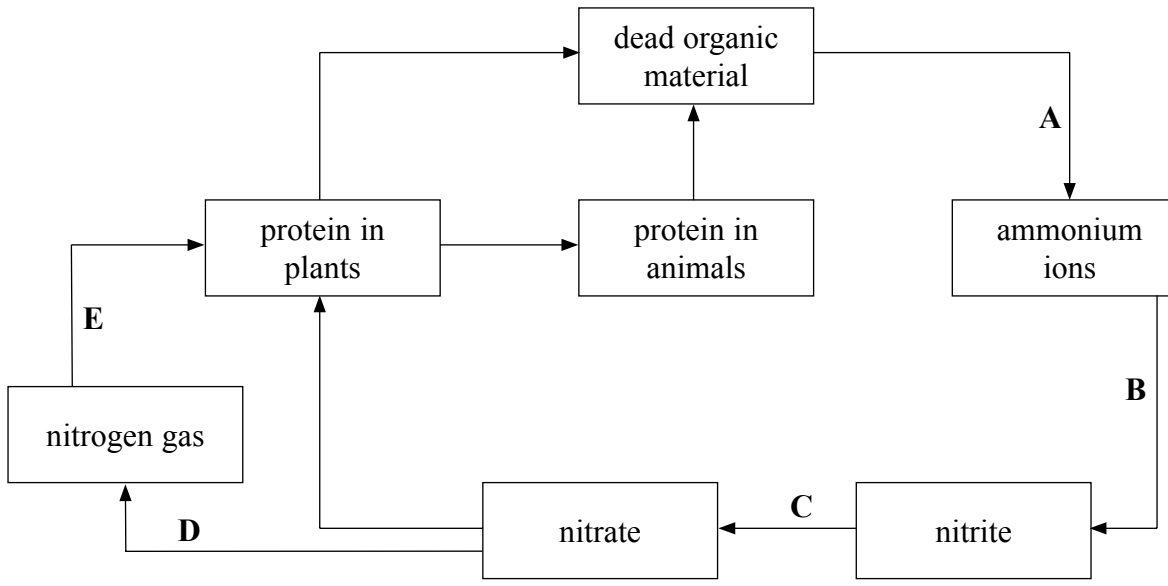
13. The diagram shows some of the processes in the nitrogen cycle.



Bacteria are involved in the stages labelled **A**, **B**, **C**, **D** and **E**.

(a) Give the letter of **one** stage that involves each of the following.

nitrifying bacteria .....

denitrifying bacteria .....

nitrogen-fixing bacteria .....

(3)

(b) Fungi are also involved in the nitrogen cycle. Describe how fungi feed.

.....

.....

.....

.....

.....

.....

(2)

Leave blank

(c) Explain how the use of nitrate fertiliser on a farmer's field can affect algal growth in rivers.

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(4) **Q13**

(Total 9 marks)

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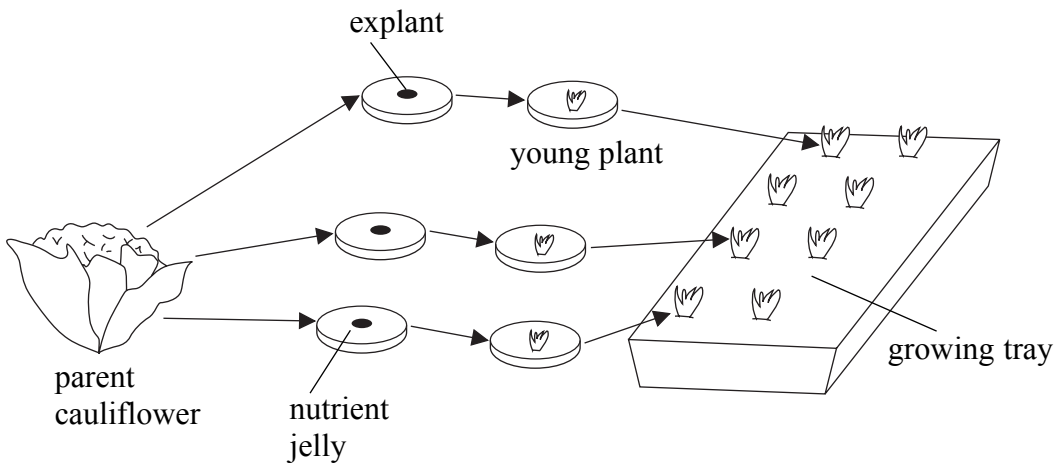
14. Cauliflowers are vegetables. They may be grown by micropropagation. Small pieces of plant (explants) are grown on nutrient jelly. The young plants are then transferred into growing trays. The technique produces clones. The process is shown in the diagram.



(a) Explain why the young cauliflower plants are described as clones.

.....

.....

.....

(2)

(b) Give **one** advantage and **one** disadvantage to the grower of producing new cauliflower plants that are clones.

Advantage .....

.....

.....

Disadvantage .....

.....

.....

(2)

Leave blank

(c) Scientists have produced transgenic animals. These animals can also be cloned.

(i) What is meant by the term transgenic?

.....

.....

.....

.....

(2)

(ii) Describe **two** possible uses of transgenic animals.

Use 1 .....

.....

.....

.....

Use 2 .....

.....

.....

.....

(4)

Q14

(Total 10 marks)

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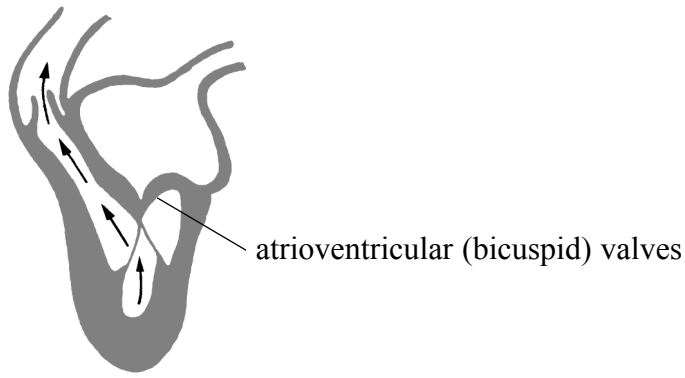
15. (a) The diagram shows a section through the left side of the heart as seen from the front. The black arrows indicate the direction of blood flow.



(i) On the diagram, use an arrow and the letter **A** to show the left atrium.

(1)

(ii) Give **two** features of the diagram which show that the ventricle is contracting.

1 .....

.....

2 .....

.....

(2)

(iii) Name the vessel through which blood enters the left side of the heart.

.....

(1)

Leave blank

(b) When a part of the heart contracts, the blood pressure in that part increases. When the part relaxes, the blood pressure in that part decreases.

The table shows the changes in blood pressure in the left atrium, the left ventricle and the aorta at different times during a sequence of contraction and relaxation of the heart.

Time in s	Blood pressure in kPa		
	Left atrium	Left ventricle	Aorta
0.0	0.5	0.4	10.6
0.1	1.2	0.7	10.6
0.2	0.3	6.7	10.6
0.3	0.4	17.3	16.0
0.4	0.8	8.0	12.0

(i) At which time is the left atrium most relaxed?

.....

(1)

(ii) Between which times are the atrioventricular valves closed?

.....

(1)

(iii) At which time does blood start flowing into the aorta? Explain your answer.

.....

.....

.....

.....

.....

(3)

(Total 9 marks)

Q15

Leave blank

16. Cystic fibrosis is a condition that affects the lungs.

(a) People with cystic fibrosis have mucus in the air passages of their lungs that is thicker and stickier than normal.

Suggest how cystic fibrosis affects the ability of a person to do exercise.

.....

.....

.....

.....

.....

.....

(3)

Leave blank

(b) Cystic fibrosis is an inherited condition. Attempts have been made to treat people with cystic fibrosis by transferring normal genes into lung cells with defective genes. This is an example of genetic modification.

Describe how a gene can be transferred from one organism to another using genetic modification.

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(6) **Q16**

(Total 9 marks)

TOTAL FOR PAPER: 120 MARKS

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