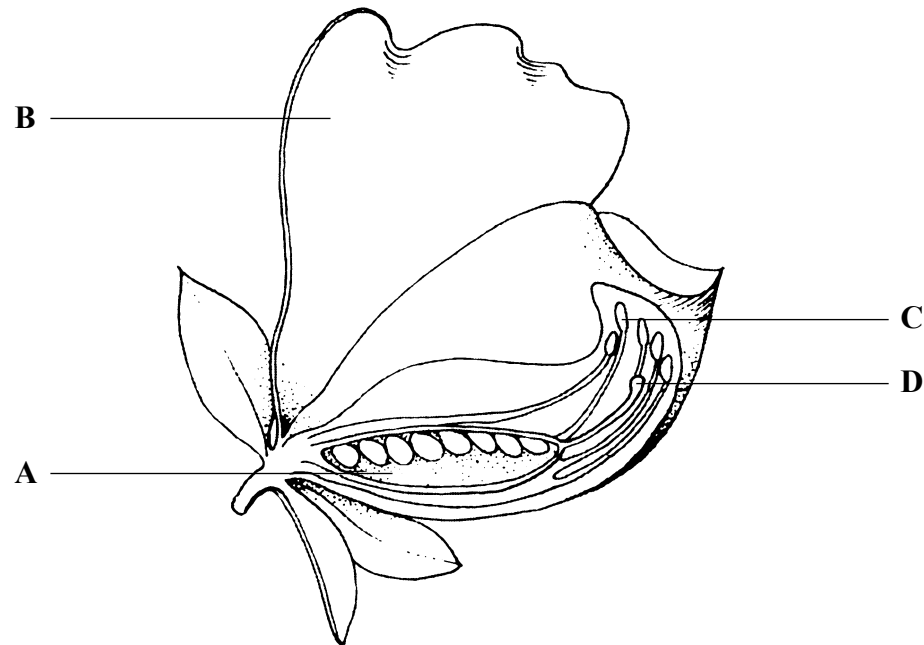




1. Flowering plants reproduce sexually using structures in their flowers.

The diagram below shows an insect-pollinated flower.



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

**A** .....

**B** .....

**C** .....

**D** ..... (4)

(ii) Which letter shows where pollen must land if fertilisation is to occur?

..... (1)

(b) Describe what happens to structures **A** and **B** after fertilisation.

Structure **A** .....

.....

.....

Structure **B** .....

.....

..... (2)



Leave  
blank

(c) Give **three** ways in which this insect-pollinated flower differs from a wind-pollinated flower.

1 .....

.....

2 .....

.....

3 .....

.....

**(3)**

(d) Some students wanted to study meiosis. From which parts of this flower should they take cells? Explain your answer.

.....

.....

.....

.....

**(2)**

**Q1**

**(Total 12 marks)**

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2. The table below shows the energy used by a typical 25-year-old woman doing various activities. She has a mass of 62 kg.

Activity	Energy used in kJ per minute
Dancing	19
Running	27
Sitting	5
Standing	9
Walking slowly	11
Walking up and down stairs	28

(a) (i) Which activity uses the most energy per minute?

.....  
(1)

(ii) Calculate the percentage increase in energy used per minute when the person has been sitting, then walks up and down stairs. Show your working.

Answer .....  
(2)

(b) Explain why dancing uses more energy than walking slowly.

.....  
.....  
.....  
(2)

(c) These data apply to a 25-year-old woman with a mass of 62 kg. Suggest what difference there would be if the woman weighed 75 kg. Give a reason for your answer.

.....  
.....  
.....  
(2)

(Total 7 marks)

Q2



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blank

3. The table below shows some of the major groups of living organisms, their features and examples of each group.

Complete the table by writing the name of the groups, **two** features of fungi and **one** example of each group in the empty boxes.

Group	Features	One example
	<ol style="list-style-type: none"><li>1. Multicellular</li><li>2. Carry out photosynthesis</li><li>3. Have cell walls</li></ol>	
	<ol style="list-style-type: none"><li>1. Multicellular</li><li>2. Can usually move</li><li>3. Do not have cell walls</li></ol>	
Fungi	<ol style="list-style-type: none"><li>1.</li><li>2.</li></ol>	<i>Mucor</i>
	<ol style="list-style-type: none"><li>1. Microscopic, single-celled</li><li>2. Lack nucleus</li><li>3. Some free living, some feed on dead organisms, others pathogenic</li></ol>	<i>Pneumococcus</i>
Virus	<ol style="list-style-type: none"><li>1. Very small particles</li><li>2. Can only live inside other organisms</li></ol>	

(Total 8 marks)

Q3

5

Turn over



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4. The passage below describes how waste substances are removed from the body. Write on the dotted lines the most suitable word or words to complete the passage.

Removal of waste products from the body is called .....

Two organs that carry this out are the lungs and the kidneys. The waste products released by the lungs are ..... and

.....

The kidneys release a liquid called ..... This fluid passes out of the kidneys down two tubes called ..... to the ..... where it is stored. The liquid passes out of the body through a single tube called the .....

Q4

(Total 7 marks)

7



Turn over

5. (a) The table below lists some hormones and gives **one** effect of each. Complete the empty boxes in the table.

Hormone	One effect
Insulin	Blood glucose level decreased
	Heart rate increased
	Uterus lining repaired
Progesterone	
ADH	
	Stimulates the development of male secondary sexual characteristics

(5)

(b) (i) Name the substance that is made when insulin lowers blood glucose levels.

.....

(1)

(ii) Explain what would happen to red blood cells if blood glucose levels became very high because insulin secretion failed.

.....  
 .....  
 .....  
 .....  
 .....

(3)





(c) Human insulin can be produced in large quantities using genetically modified bacteria. Describe the process of producing genetically modified bacteria.

.....

.....

.....

.....

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.....

.....

.....

.....

(4)

(Total 13 marks)

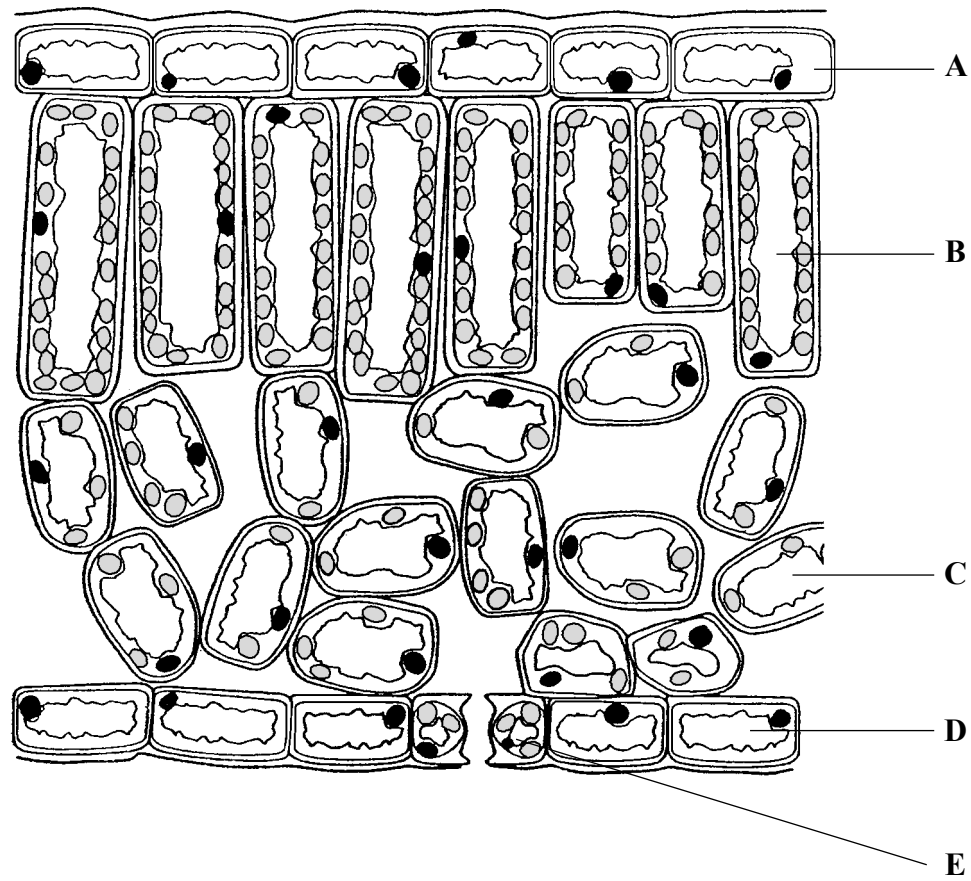
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Q5

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6. The diagram below shows a cross section through a typical leaf.



(a) Name the cells labelled A, B, C and D.

A .....

B .....

C .....

D .....

(4)



Leave  
blank

(b) In which of these cells would most photosynthesis take place? Give **two** reasons for your answer.

Cell .....

Reason 1 .....

.....

Reason 2 .....

.....

**(3)**

(c) Describe the role of structure **E** in each of the following.

(i) Gas exchange .....

.....

.....

.....

**(2)**

(ii) Transpiration .....

.....

.....

.....

**(2)**

**Q6**

**(Total 11 marks)**



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7. The human body requires the correct balance of nutrients to keep it in good condition.

(a) Explain how an unsuitable diet can lead to obesity.

.....  
.....  
.....  
.....  
.....  
.....

(3)

(b) Obesity has harmful effects on the body.

Describe the effects of obesity on the heart and circulation system.

.....  
.....  
.....  
.....

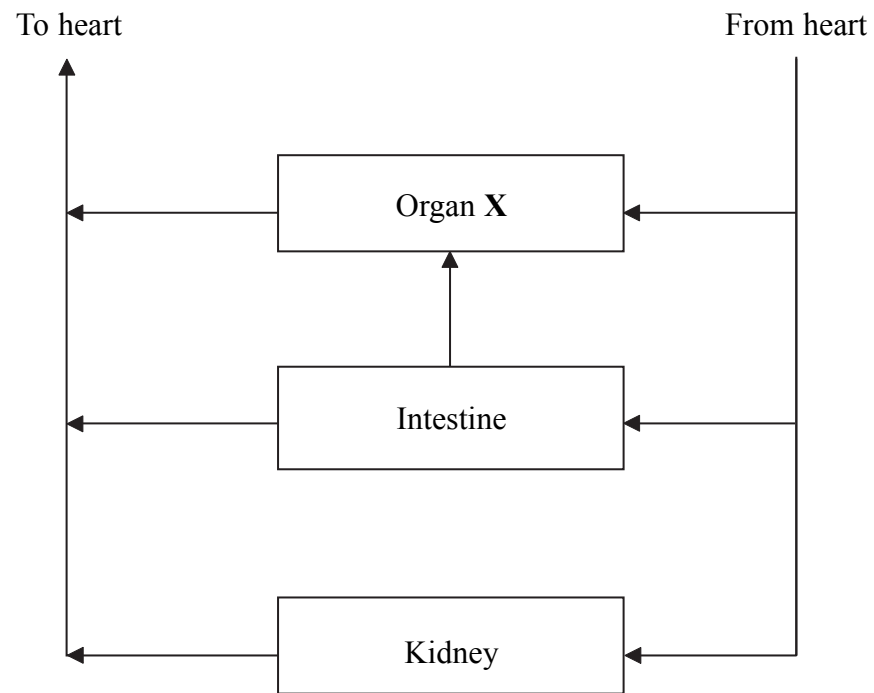
(2)

Q7

(Total 5 marks)



8. The diagram below shows part of the human circulatory system. The arrows show the direction of blood flow.



(a) (i) Name organ X.

..... (1)

(ii) Name the blood vessel coming from the heart.

..... (1)

(iii) Name the blood vessel going from the intestine to organ X.

..... (1)



Leave  
blank

(b) (i) Name the blood vessel entering the kidney.

.....  
(1)

(ii) The concentration of certain components in the blood entering the kidney was compared with the concentration of the same components in the blood leaving the kidney.

Complete the table below by writing the words 'more', 'same' or 'less' in the correct boxes in each row of the table. The first one has been done for you.

Component	Relative amount of the component in the blood	
	Blood entering kidney	Blood leaving kidney
Antibody	same	same
Urea		
Water		
Red blood cells		
Carbon dioxide		

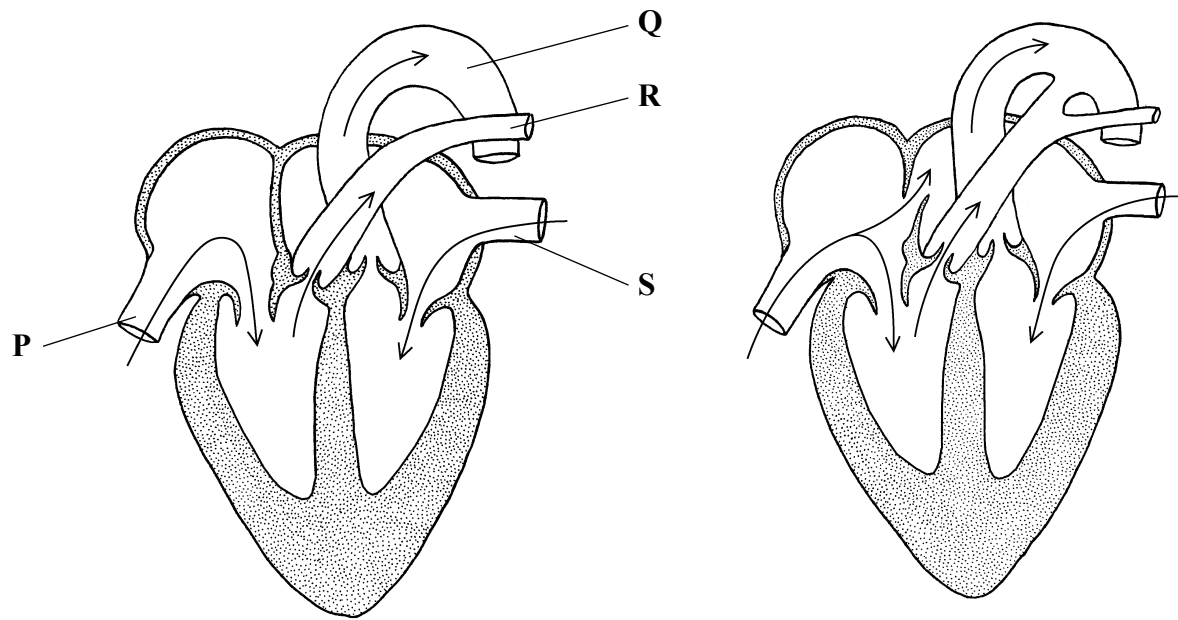
(4)

Q8

(Total 8 marks)



9. The diagrams below show cross sections through an adult heart and the heart of a fetus (developing embryo). The arrows show the direction of blood flow.



Adult heart

Fetal heart

(a) Name the blood vessels labelled P, Q, R and S.

P .....

Q .....

R .....

S .....

(4)

(b) Both hearts pump blood to gas exchange surfaces where oxygen is absorbed. Name the gas exchange surface of the adult and of the fetus.

Adult .....

Fetus .....

(2)





Leave  
blank

(c) Use the information in the diagrams to describe **two** ways in which the blood flow in the heart of the fetus differs from the blood flow in the adult heart.

1 .....

.....

2 .....

.....

(2)

Q9

(Total 8 marks)



10. Gregor Mendel lived in the 19th century and studied inheritance in pea plants. He investigated several characteristics including height and flower colour.

(a) In one experiment, he crossed pure-breeding tall plants with pure-breeding dwarf plants. All of the offspring of this cross grew into tall plants.

(i) Complete the genetic diagram below to show the genotypes of the parents, the gametes and the genotype of the offspring produced. Use the letters **T** or **t** to represent the allele for height.

Genotype of tall plant    ×    Genotype of dwarf plant

Gametes

Genotype of offspring

(3)

(ii) Suggest why no plants of an intermediate height were found.

.....  
.....  
.....  
.....

(2)



Leave  
blank

(b) Mendel also crossed together pure-breeding plants with purple flowers with pure-breeding plants with white flowers. All of the offspring had purple flowers.

These purple-flowered offspring were then allowed to self-pollinate. Complete the genetic diagram below to show the results of this cross. Use the letters **R** or **r** to represent the allele for flower colour.

Purple-flowered plant    ×    Purple-flowered plant

Genotype

Gametes

Genotype of offspring

Phenotype of offspring

(4)

Q10

(Total 9 marks)

19

Turn over



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11. The table below gives some information about the food components required for a balanced diet.

(a) Complete the table by writing **one** appropriate answer in each blank box.

Food component	Required for	Example of good food source	Deficiency disease
Calcium			Rickets
	Development of bones, cartilage and gums		Scurvy
Protein			
			Anaemia

(10)

(b) Describe how you could test for the presence of protein in a food sample.

.....  
.....  
.....  
.....

(2)

Q11

(Total 12 marks)

**TOTAL FOR PAPER: 100 MARKS**

**END**

Acknowledgement: diagram on p2 ©SAPS, Cambridge

