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

Friday 18 May 2007 – Morning

Time: 2 hours

Materials required for examination
Nil

Items included with question papers
Nil

Question Number	Leave Blank
1	
2	
3	
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11	
12	
13	
14	
15	
Total	

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
Some questions must be answered with a cross in a box (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).
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 the parts of questions are shown in round brackets: e.g. **(2)**.
There are 24 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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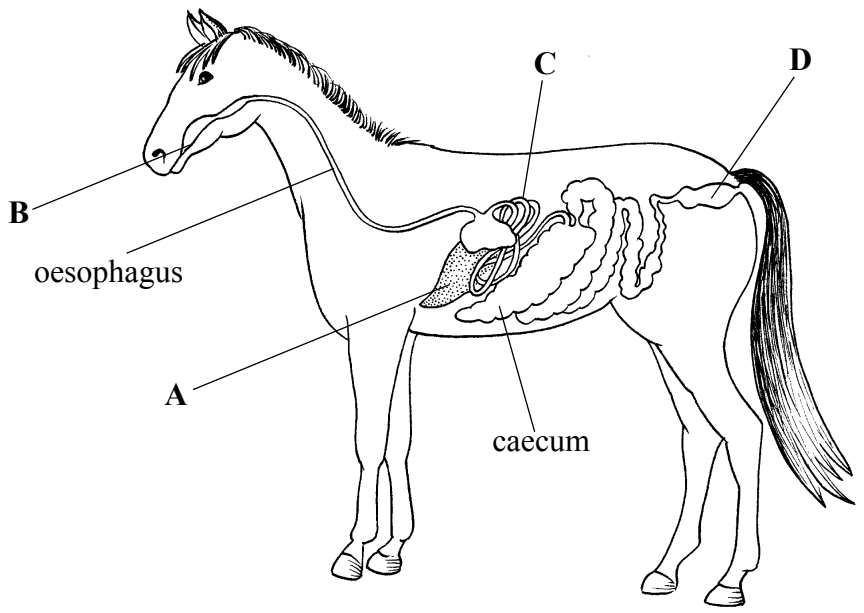
Leave blank

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

1. The horse is a mammal and the digestive system is similar to that of humans.

The diagram shows the digestive system of a horse with parts labelled **A**, **B**, **C** and **D**.



(a) The statements below are about the digestive system. Choose the correct letter to match each statement. Put a cross (☒) in the correct box.

This is where plant food is chewed	**A** ☒	**B** ☒	**C** ☒	**D** ☒
This is where faeces are stored	**A** ☒	**B** ☒	**C** ☒	**D** ☒
This is where most villi are found	**A** ☒	**B** ☒	**C** ☒	**D** ☒

(3)

(b) Explain how food is moved along the oesophagus.

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(2)

Leave blank

(c) The caecum contains bacteria. These bacteria help the horse by digesting the carbohydrate in plant cell walls and by making vitamin C.

(i) Name the carbohydrate found in plant cell walls.

.....

(1)

(ii) Why does a horse need vitamin C?

.....

.....

(1)

(d) The table gives the energy needed by the horse at increasing levels of exercise from a slow walk to a gallop.

Level of exercise	**Energy needed in kJ per kg per hour**
slow walk	7.1
fast walk	10.5
slow trot	27.1
medium trot	39.7
fast trot	57.3
gallop	96.1

(i) Describe the relationship between the level of exercise and energy needed.

.....

.....

(1)

(ii) A horse weighing 500 kg walks fast for one hour. How much energy does it use?

..... kJ

(1)

Q1

(Total 9 marks)

Leave blank

2. Different types of cells may contain different structures.

Complete the table to show the structures contained in the different cells. If the cell contains the structure put a tick (✓) in the box. If the cell does not contain the structure put a cross (✗).

Some have been done for you.

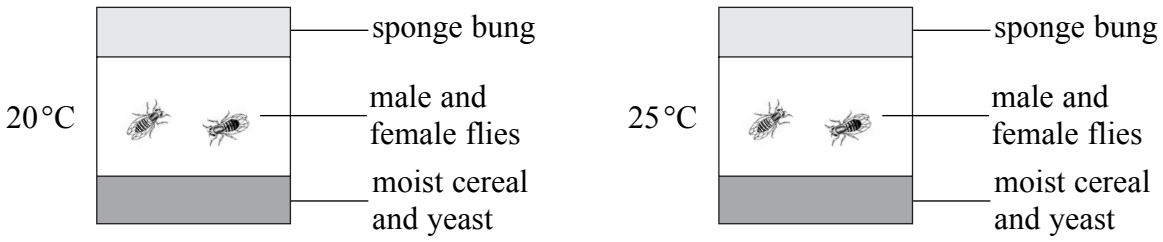
Cell	Structure			
	Nucleus	**Cytoplasm**	**Cell wall**	**Chloroplast**
neurone (an animal cell)		✓		
Pneumococcus (a bacterial cell)			✓	✗
yeast (a fungal cell)	✓			

Q2

(Total 4 marks)

Leave blank

3. The tubes below were used to breed insect flies. One tube was kept at 20 °C and the other tube was kept at 25 °C. Each tube contained one male and one female fly.



(a) (i) The sponge bung stops the flies escaping. It also allows gases to enter and leave the tube. Name **one** gas used by the flies and **one** gas produced by the flies.

gas used .....

gas produced .....

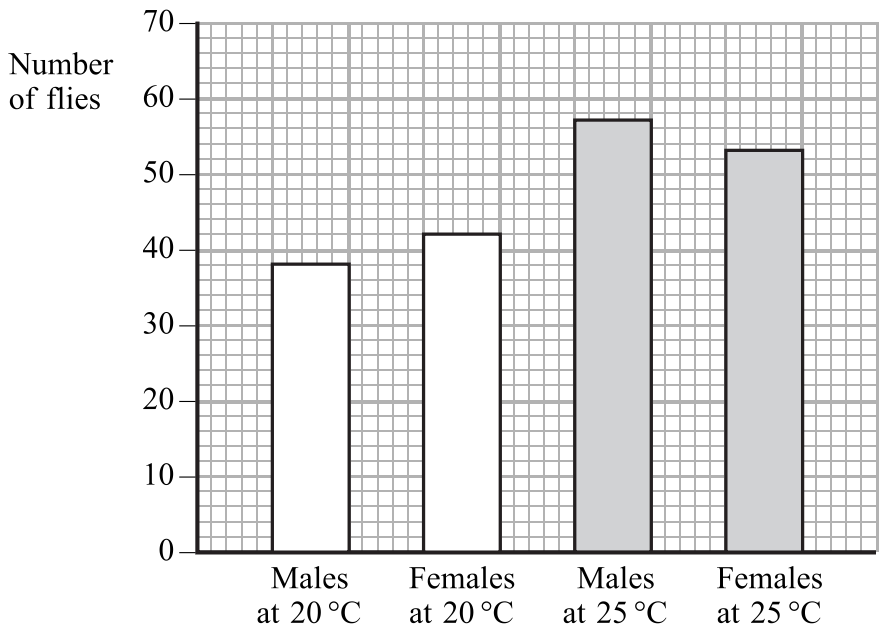
(1)

(ii) The flies feed on the yeast cells and the yeast cells feed on the cereal. Use this information to draw a food chain in the space below.

(2)

Leave blank

(b) The graph shows the number of male and female offspring produced in each tube after two weeks.



(i) How many male offspring were produced after two weeks at 20 °C?

.....

(1)

(ii) More male offspring were produced after 2 weeks at 25 °C than at 20 °C. Calculate the percentage increase at the higher temperature. Show your working.

..... % increase

(2)

(c) Suggest why more offspring were produced after two weeks at 25 °C.

.....

.....

.....

.....

(2)

Leave blank

(d) (i) Equal numbers of male and female offspring were expected at 20 °C.

Use your knowledge of how sex chromosomes are inherited to show why. You may use a genetic diagram in your answer.

.....

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.....

.....

(5)

(ii) Suggest **one** reason why equal numbers of male and female offspring were not obtained at 20 °C.

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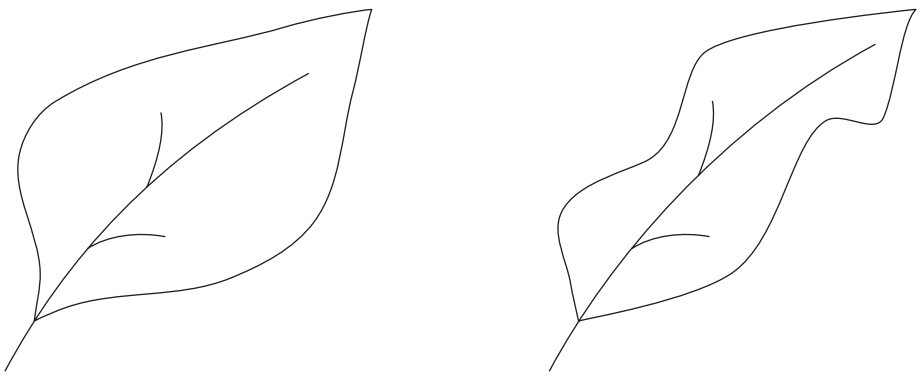
(1)

Q3

(Total 14 marks)

Leave blank

4. The diagram shows a leaf from a crop plant before and after it was attacked by an insect pest.



Before **After**

(a) Suggest how the insect pests would affect crop yield.

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.....

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.....

(3)

(b) Explain why farmers often spray pesticide onto their crops.

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(2)

Leave blank

(c) The table shows the changes in the numbers of an insect pest in a glasshouse during a period of 50 days. The crop was sprayed with pesticide twice during this time.

Time in days	Number of insects in thousands
0	44
5	54
6	6
14	8
20	12
28	20
29	16
35	28
42	42
50	54

(i) The crop was first sprayed with pesticide on day 5. Use the data in the table to suggest the day on which the crop was sprayed with pesticide for the second time.

.....

(1)

(ii) What was the decrease in numbers of the insect after spraying with pesticide on day 5?

.....

(1)

(d) Give **two** disadvantages of using pesticides.

1 .....

.....

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2 .....

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(2)

Q4

(Total 9 marks)

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5. *Campylobacter jejuni* is a bacterium that causes food poisoning. Most people recover from this illness, but in some people serious problems occur.

The effects could lead to kidney failure and damage to red blood cells.

(a) (i) Name **one** substance that would not be removed from the body if the kidneys failed.

.....

(1)

(ii) Why would damage to red blood cells lead to problems?

.....

.....

(1)

(b) Another effect can be damage to nerve cells. This is caused when nerve cells are damaged by the antibodies that the body produces to attack the *Campylobacter* bacteria.

(i) Name the cells in the body that produce antibodies.

.....

(1)

(ii) Damage to nerve cells that control breathing can lead to paralysis. The paralysis occurs because the muscles involved in breathing do not receive impulses to make them contract.

Explain why paralysis of breathing muscles is dangerous.

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(3)

Q5

(Total 6 marks)

Leave blank

6. When a sample of water is tested, its water quality is measured by finding out how much of its oxygen is used up when it is kept sealed in the dark for five days. The oxygen is used by microorganisms breaking down organic matter in the water.

The amount of oxygen used up is called the biological oxygen demand or BOD, and is calculated in mg per litre.

(a) Suggest why the sealed samples are kept in the dark.

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(2)

(b) Farm waste contains organic matter and, by law, farms are not allowed to release waste that produces a BOD greater than 25 mg of oxygen per litre.

The table below gives readings for the BOD in the waste produced by four farms.

Farm	BOD in mg per litre	Volume of waste produced per week in litres
A	28	180
B	20	30
C	115	40
D	76	134

(i) Which of these farms are breaking the law?

.....

(1)

(ii) What is the total amount of oxygen used up by microorganisms in one week when they breakdown waste from farm B?

..... mg

(1)

(iii) Which farm causes the greatest total BOD problem?

.....

(1)

Leave blank

(c) Explain the possible effects on a river of releasing waste with a high BOD.

.....

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.....

(3)

Q6

(Total 8 marks)

7. Describe and explain the consequences of smoking on human lungs.

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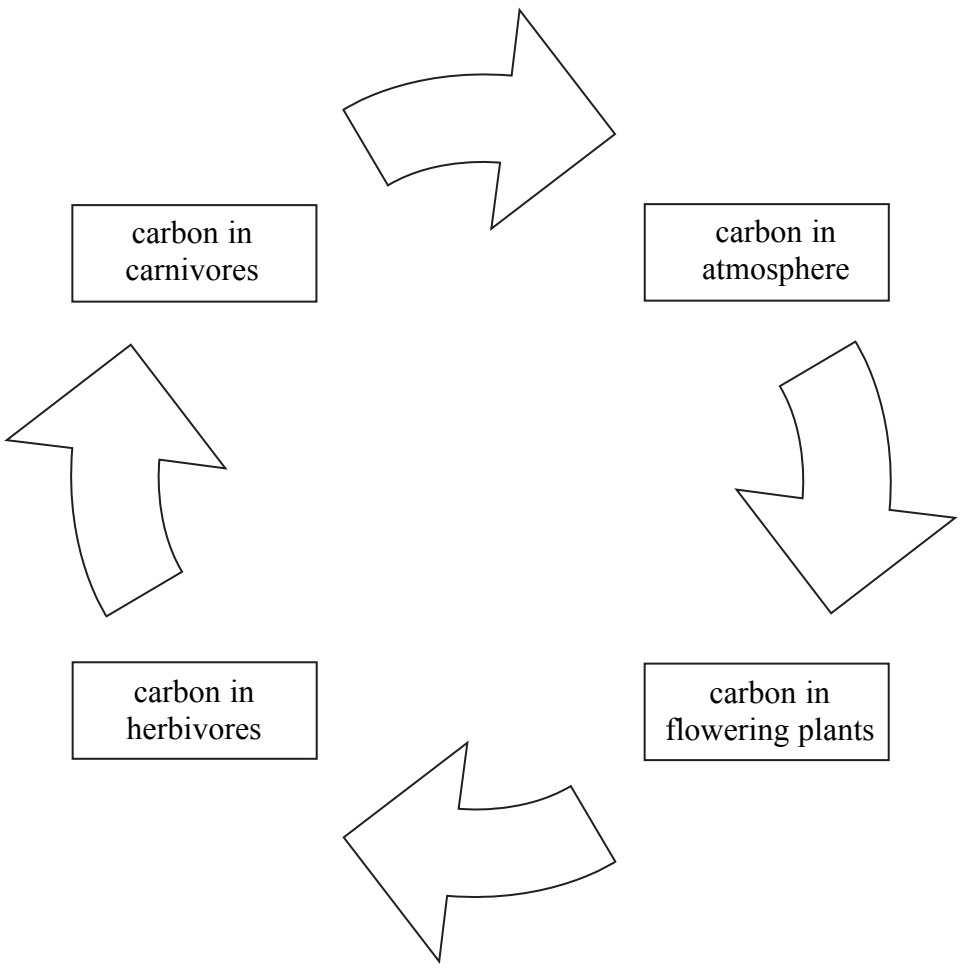
Q7

(Total 5 marks)

Leave blank

8. The diagram shows part of the carbon cycle. This shows how carbon compounds enter and leave living organisms.



(a) (i) The arrows on the diagram represent various processes.

Write a word next to each arrow to show which process it represents. Choose your words from the list. Each word may be used once, more than once or not at all.

- respiration
- photosynthesis
- feeding

(4)

(ii) On the diagram, draw and label **one** arrow to represent the process of decomposition.

(1)

Leave blank

(b) Burning fossil fuels return carbon dioxide to the atmosphere. Explain how increased use of fossil fuels could affect the environment.

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(5)

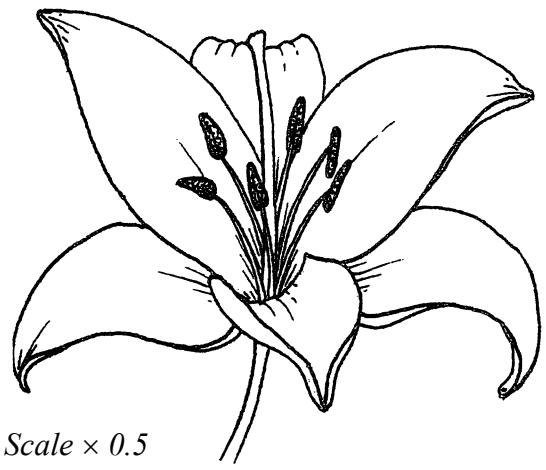
(Total 10 marks)

Q8

Leave blank

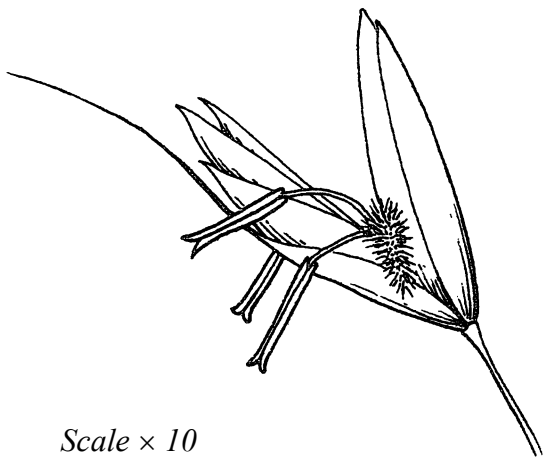
9. The two flowers shown below come from two different species A and B. Flower A is insect-pollinated and flower B is wind-pollinated. One reproduces with the aid of insects; the other uses wind.

Flower A



Scale × 0.5

Flower B



Scale × 10

(a) Complete the table which compares the structure of the two flowers.

Feature	Flower A	Flower B
position of stamens		
position of stigma		
size of petals		
type of stigma		

(4)

(b) Explain what is meant by the term **insect-pollinated**.

.....

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.....

(2)

Q9

(Total 6 marks)

Leave blank

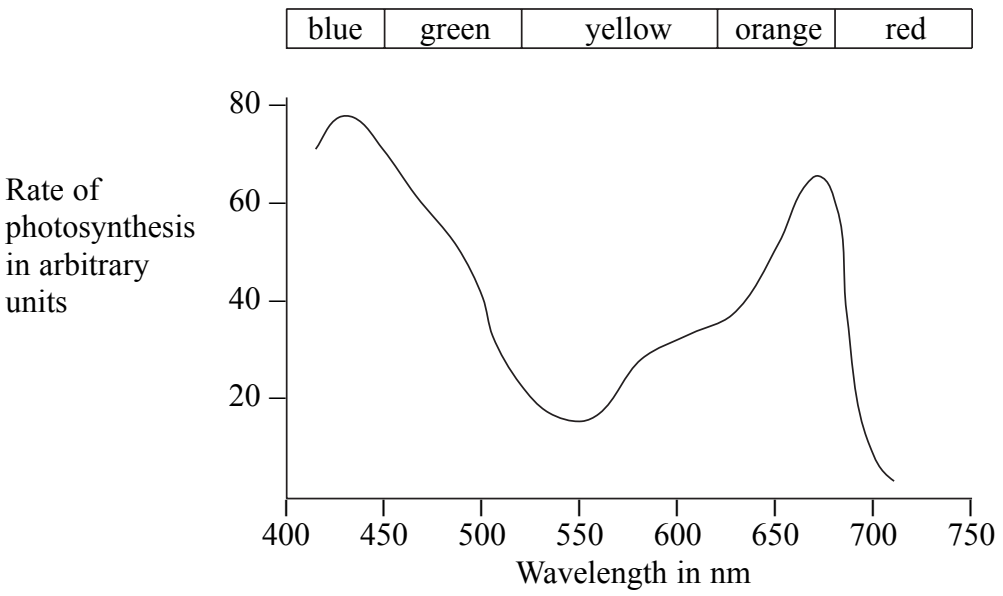
10. Chlorophyll is a green pigment found in plants. It absorbs light, which is used in photosynthesis.

(a) In which cells of the leaf would you expect to find most chlorophyll?

.....

(1)

(b) The graph shows the rate of photosynthesis of a plant when exposed to different colours of light. Different colours of light have different wavelengths.



At which **two** wavelengths of light is the rate of photosynthesis highest?

.....

(2)

(c) Describe and explain the effect on the rate of photosynthesis you would expect if green light is shone on the leaf instead of blue light.

.....

.....

.....

.....

(2)

(d) Name **two** factors, other than wavelength, that can affect the rate of photosynthesis.

1 .....

2 .....

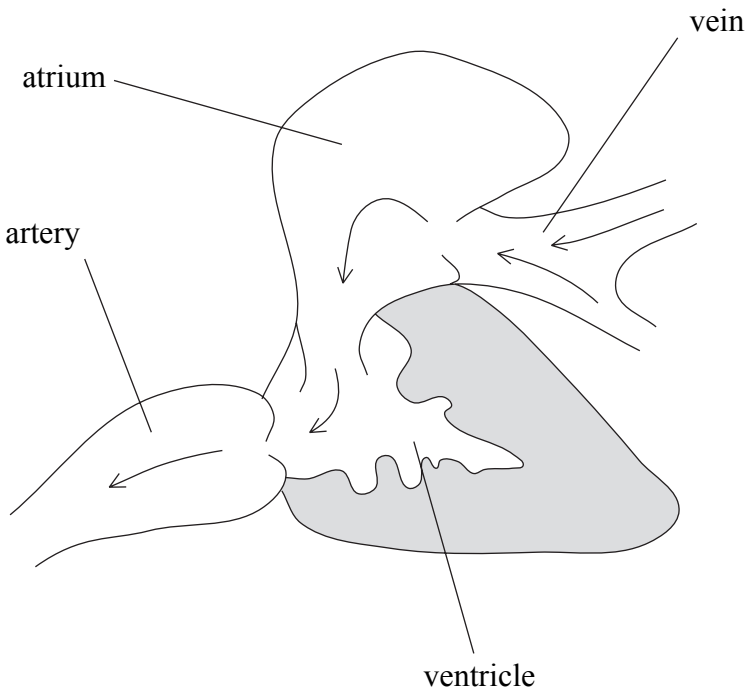
(2)

Q10

(Total 7 marks)

Leave blank

11. The diagram shows a section through the heart of a freshwater fish. The arrows show the direction of blood flow.



(a) (i) Give **two** ways in which the structure of the fish heart is similar to the heart of a human.

1 .....

2 .....

(2)

(ii) Give **two** ways in which the structure of the fish heart differs from the heart of a human.

1 .....

2 .....

(2)

(b) The circulation system of a human is known as a double circulation system. Suggest why the circulation system of a fish is known as a single circulation system.

.....

.....

.....

.....

(2)

Leave blank

(c) Explain the response of the human heart to adrenaline. In your answer include

- when adrenaline is made
- where it is made
- the effect it has on the heart

.....

.....

.....

.....

.....

.....

(3)

(d) The heart pumps blood which transports substances around the body. Complete the table below to show the origin and destination of each of the substances listed.

Substance	**Origin (where taken into the blood)**	**Destination (where removed from the blood)**
oxygen		respiring cells
glucose		respiring cells
urea	liver	
ADH		

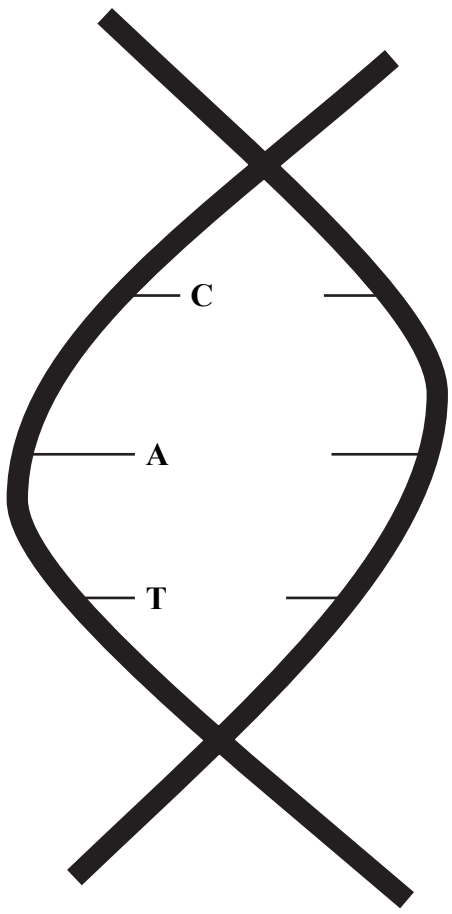
(5)

Q11

(Total 14 marks)

Leave blank

12. The diagram below shows part of a DNA molecule. It consists of two strands linked by a series of paired bases.



(a) (i) The bases in DNA are adenine (**A**), cytosine (**C**), guanine (**G**) and thymine (**T**). Complete the diagram above by writing in the correct base to complete each pair.

(3)

(ii) The DNA molecule is known as a double helix. Explain what is meant by the term 'double helix'.

.....

.....

.....

(1)

Leave blank

(b) Genetic modification (genetic engineering) uses enzymes to cut and join sections of DNA.

(i) Name the enzyme used to cut DNA at a specific site.

.....

(1)

(ii) Name the enzyme used to join two sections of DNA.

.....

(1)

(iii) What name is given to an organism that has been genetically modified to contain DNA from a different species?

.....

(1)

(c) (i) Name **one** human hormone that is produced by genetically modified bacteria.

.....

(1)

(ii) Give **one** advantage of using genetically modified bacteria to produce this hormone.

.....

.....

(1)

Q12

(Total 9 marks)

Leave blank

13. The passage below describes stages involved in the process of micropropagation in plants.

Use suitable words to complete the sentences in the passage.

Very small pieces are cut from the tips of stems or side shoots of a plant.

When these pieces have been removed they are called

..... . They are cut to a size

of about 0.5 to 1 mm. They are then placed

in ..... medium

containing ..... and

....., which help the pieces to

grow into small plants. When the small plants have grown roots they are

transferred to a glasshouse. They are grown in pots containing

....., and

conditions such as ..... and

..... can be controlled. The small

plants produced are called .....,

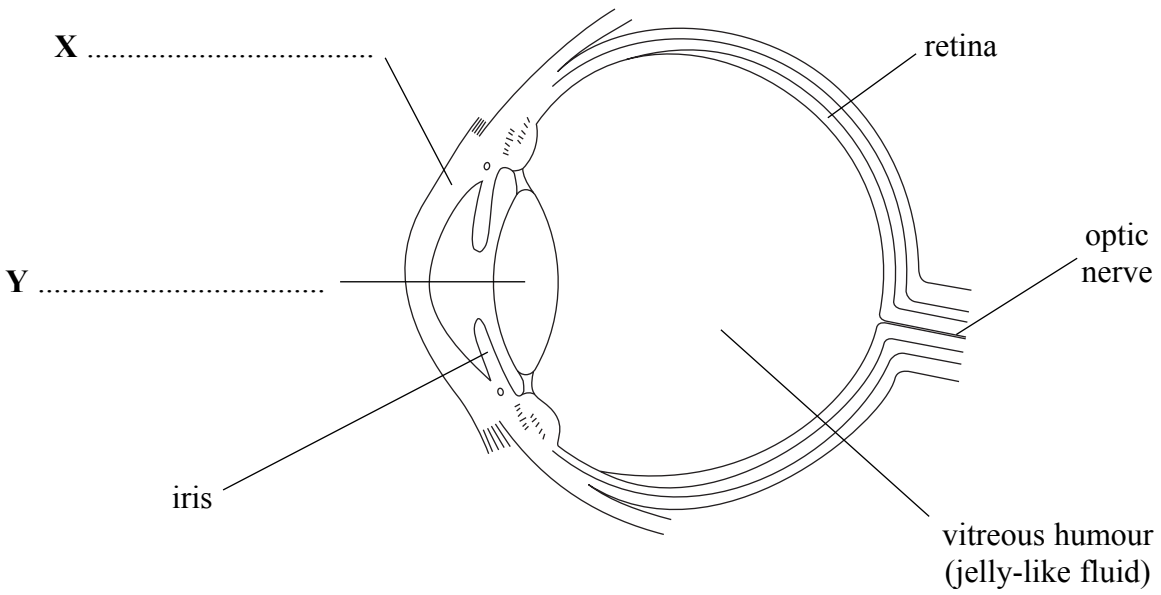
which means they are genetically ..... .

Q13

(Total 9 marks)

Leave blank

14. The diagram shows a section through the human eye.



(a) (i) Name parts **X** and **Y** on the lines provided.

(2)

(ii) Which part of the central nervous system does the optic nerve go to?

.....

.....

(1)

(b) The vitreous humour helps to keep the retina pressed against the back of the eye. However, as a result of a severe blow to the head, sometimes the retina can come away from the back of the eye.

Suggest how this detached retina would affect vision. Explain your answer.

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(2)

Q14

(Total 5 marks)

Leave blank

15. Describe what is meant by a mutation and explain the effects a mutation could have in a population of organisms.

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Q15

(Total 5 marks)

TOTAL FOR PAPER: 120 MARKS

END