OXFORD AQA INTERNATIONAL A-LEVEL

BIOLOGY

(9610)

PAPER 2

Specimen 2018   Morning   Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a pencil
- a ruler with millimetre measurements
- a calculator

Instructions
- use black ink or ball-point pen
- answer **all** questions
- show all your working.

Information
- The marks for questions are shown in brackets
- The maximum mark for this paper is 75 marks

Please write clearly, in block capitals, to allow character computer recognition.

Centre number ☐☐☐☐☐   Candidate number ☐☐☐☐

Surname ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Forename(s) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Candidate signature _____

Answer **all** questions in the spaces provided

0 1 . 1 Some tumours are benign and some are malignant.

Describe two ways in which benign tumours may cause harm to the body.

[2 marks]

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0 1 . 2 Give **one** way in which a malignant tumour is different from a benign tumour.

[1 mark]

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0 1 . 3 Explain how exposure to a mutagen could lead to the development of a tumour.

[2 mark]

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0 1 . 4 Suggest why people with a family history of cancer are at a greater risk of cancer than those with no family history of cancer.

[1 mark]

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0 2 . 1   What is atheroma?

[2 marks]

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0 2 . 2   Atheroma makes it more likely that a blood clot will form. Describe how a blood clot may lead to a myocardial infarction.

[3 marks]

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Question 2 continues on the next page

Figure 1 shows the relationship between the amount of dairy fat eaten and the deaths from coronary heart disease (CHD) per year in different countries.

Figure 1
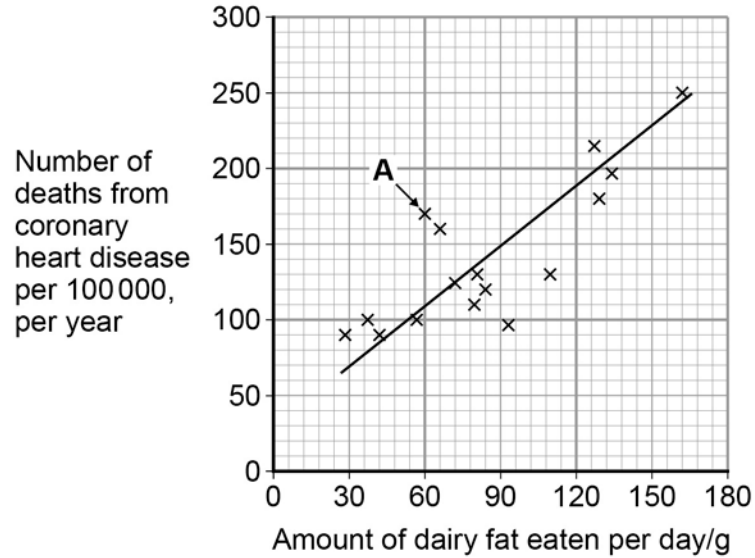
0 2 . 3 The number of deaths is given per 100 000 people. Explain why.

[2 marks]

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0 2 . 4 The population of Country **A** is 28 million people. Calculate the number of people who died in Country **A** in one year. Show your working.
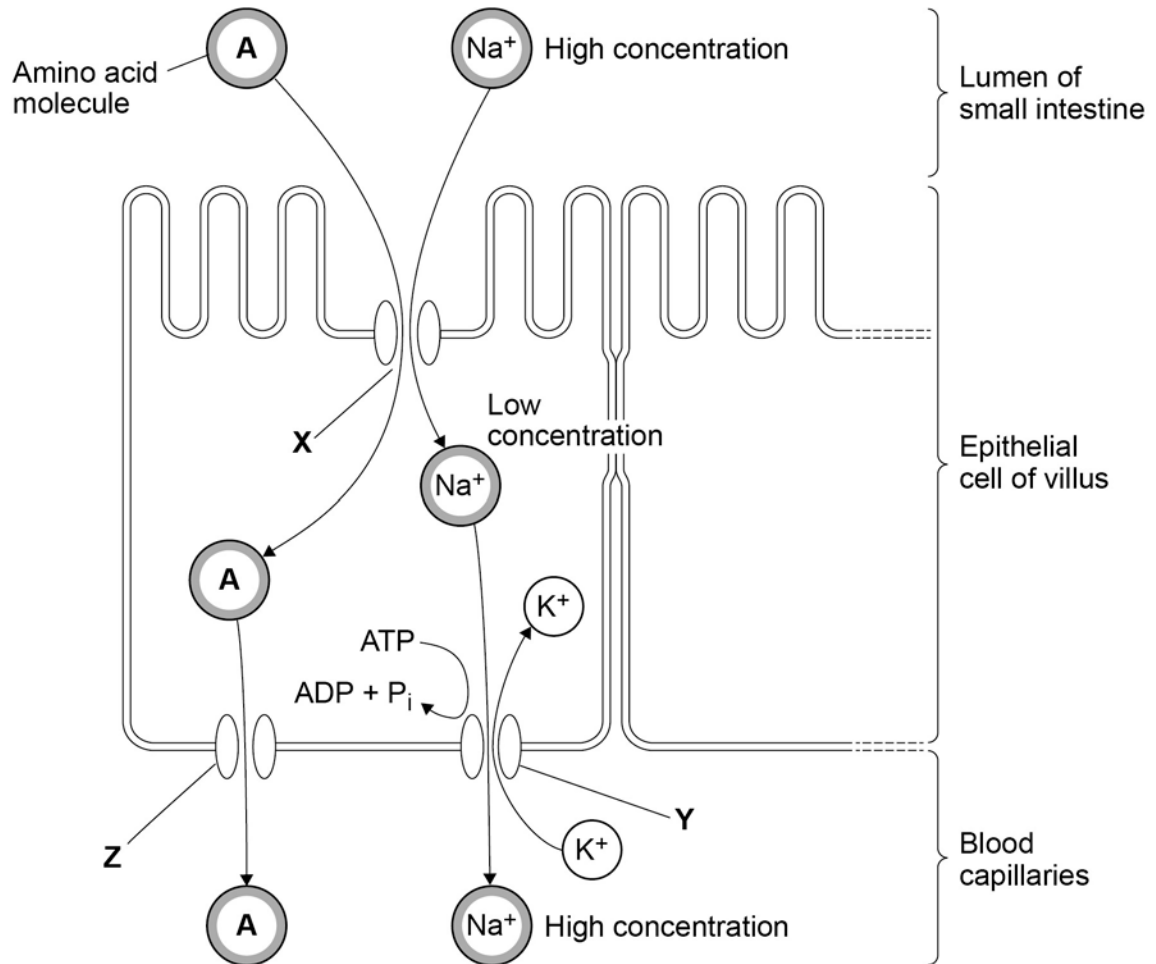
[2 marks]

Answer=_____

3   **Figure 2** shows one method by which amino acids are absorbed from the small intestine into the blood. They are co-transported into the epithelial cell with sodium ions (Na+) at point **X** on the diagram. Normally, the concentration of sodium ions inside the epithelial cell is low.

Figure 2

Dinitrophenol (DNP) prevents respiration. When treated with DNP, the sodium-potassium pump at Y no longer works. As a result, the concentration of sodium ions in the cell rises and amino acid absorption stops.

0 3 . 1   Explain why pump **Y** will **not** work in the presence of DNP.

[2 marks]

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0 3 . 2 Explain why sodium ions and amino acids are **not** absorbed from the lumen of the small intestine in the presence of DNP.

[2 marks]

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0 3 . 3 By what mechanism would amino acids leave the epithelial cell at point **Z**?
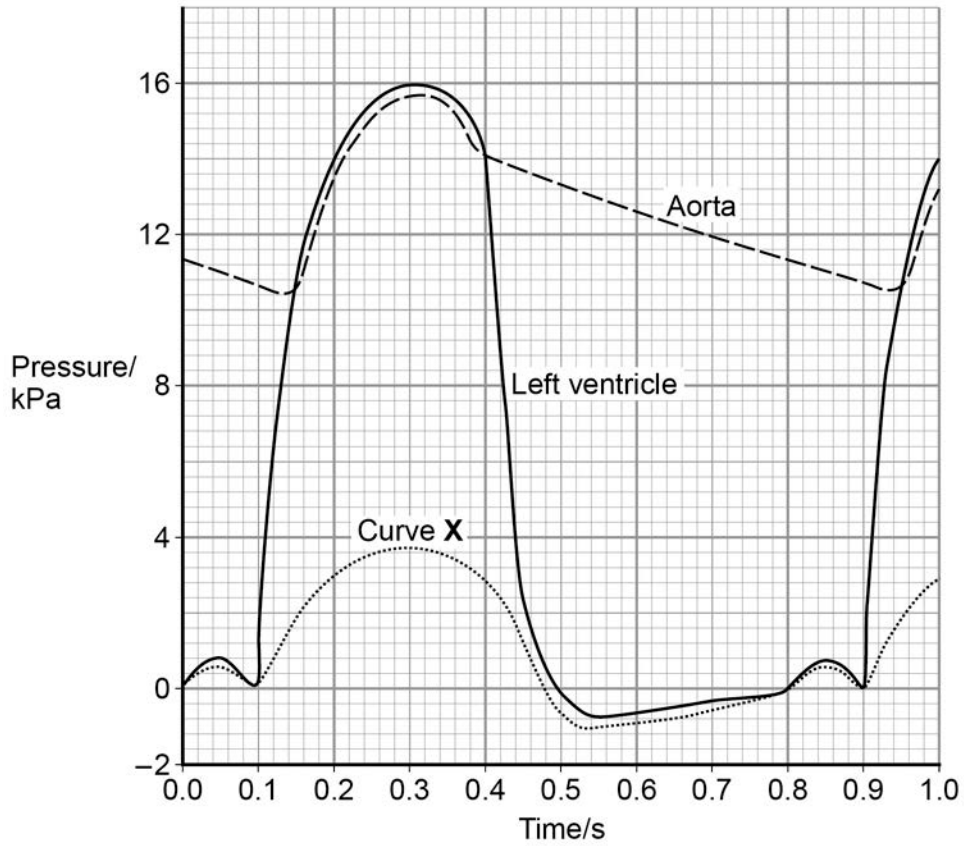
[1 mark]

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Turn over for next question

4   **Figure 3** shows changes in pressure in the aorta and different parts of the heart during a period of one second.

Figure 3

| 0 4 | . | 1 | At what time do the semilunar valves close?

[1 mark]

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| 0 4 | . | 2 | Use **figure 3** to calculate the heart rate in beats per minute. Show your working.

[2 marks]

Answer_____beats per minute

| 0 | 4 | . | 3 | What does curve **X** represent? Explain your answer.

[2 marks]

X= _____

Explanation: _____

_____

Doctors measured the thickness of the walls of three blood vessels connected to the heart in a large group of people. Their results are given in the table.

Name of vessel	Mean wall thickness /mm ± standard deviation
Aorta	5.7 ± 1.2
Pulmonary artery	1.0 ± 0.2
Pulmonary vein	0.5 ± 0.2

| 0 | 4 | . | 4 | Explain the difference in thickness between the pulmonary artery and the pulmonary vein.

[1 mark]

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| 0 4 . 5 | The thickness of the aorta wall changes during each cardiac cycle. Explain what causes the change.

[3 marks]

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Turn over for the next question

| 0 5 | . | 1 | Infection by the cholera bacterium can cause acute diarrhoea. Explain how.

[2 marks]

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The bacteria that cause cholera can be found in seawater. Outbreaks of cholera often begin in populations living near the coast.

Scientists in Bangladesh investigated the relationship between outbreaks of cholera and the sea temperature. They used the number of people admitted to hospital with cholera as a measure of the number of cases of the disease. **Figure 4** shows their results.

Figure 4
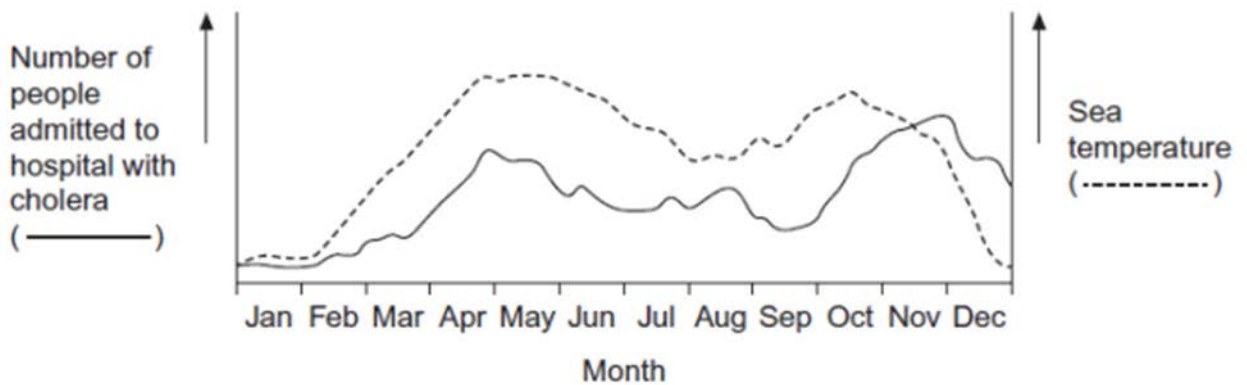
| 0 5 | . | 2 | Describe the way in which sea temperature and the number of people admitted to hospital with cholera change between January and June.

[2 marks]

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0 5 . 3 Some scientists have suggested that a rise in sea temperatures could lead to an increase in outbreaks of cholera. Use the data to evaluate this suggestion.

[2 marks]

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0 5 . 4 In areas where there are repeated outbreaks of cholera, most people who become infected by cholera bacteria do not become ill. Suggest and explain **one** reason why.
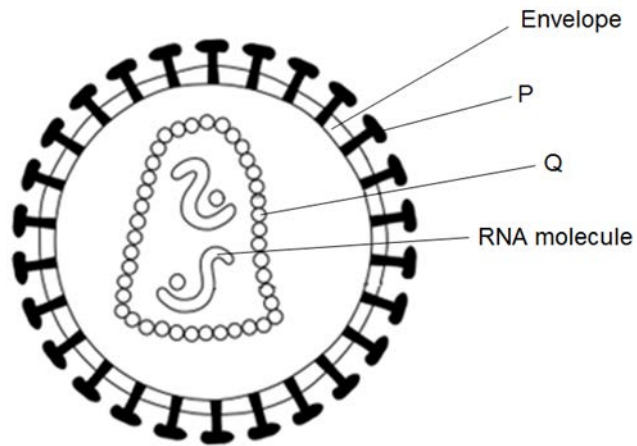
[2 marks]

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Turn over for the next question

6 **Figure 5** shows a human immunodeficiency virus (HIV).

Figure 5

0 6 . 1 Name structures **P** and **Q**

[2 marks]

Structure **P** _____

Structure **Q** _____

0 6 . 2 New viruses are produced after HIV has infected a T cell. Describe how viral enzymes are involved in this process

[3 marks]

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0 6 . 3 **Figure 6** shows changes in the number of T-cells and HIV particles in the blood of a person following infection.

Figure 6

This person developed a large number of infections about 9 years after he first became infected with HIV. Using information from **Figure 6**, explain why.

[4 marks]

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7   Students investigated the effect of removing leaves from a plant shoot on the rate of water uptake. Each student set up a potometer with a shoot that had eight leaves. All the shoots came from the same plant. The potometer they used is shown in **Figure 7.**

Figure 7
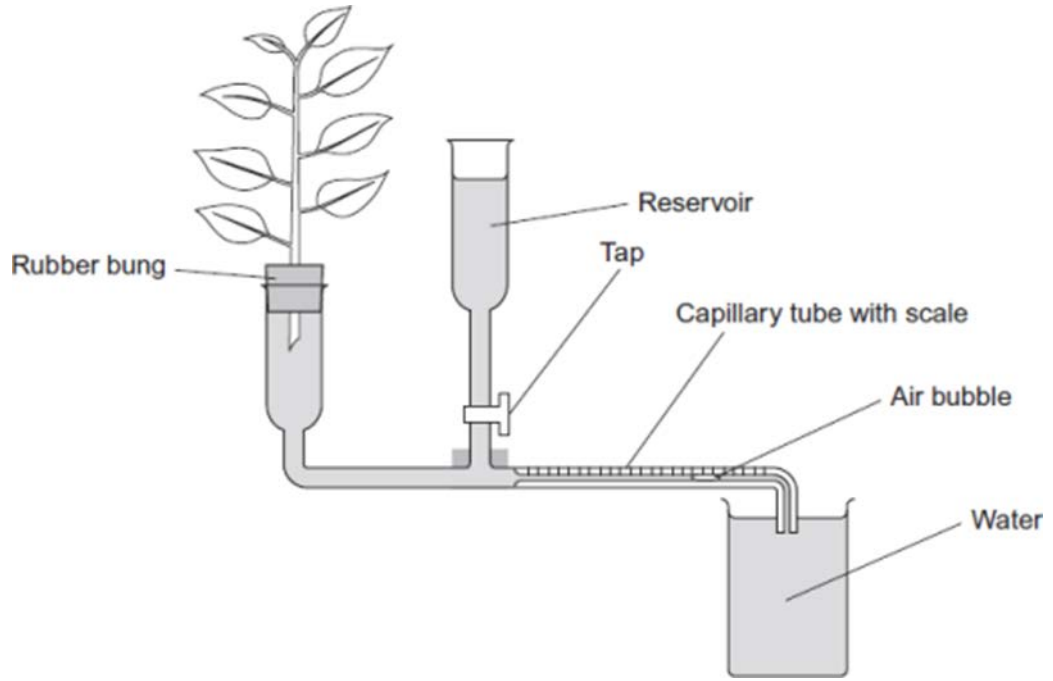
0 7 . 1   Describe how the students would have returned the air bubble to the start of the capillary tube in this investigation.

[1 mark]

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0 7 . 2 Give **two** precautions the students should have taken when setting up the potometer to obtain reliable measurements of water uptake by the plant shoot.

[2 marks]

1 _____

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2 _____

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0 7 . 3 Give **one** environmental factor that the students should have kept constant during this investigation.

[1 mark]

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0 7 . 4 A potometer measures the rate of water uptake rather than the rate of transpiration. Give **two** reasons why the potometer does **not** truly measure the rate of transpiration.

[2 marks]

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2 _____

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0 7 . 5 The students wanted to calculate the rate of water uptake by the shoot in cm^3 per minute. What measurements should they make?

[2 marks]

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0 7 . 6 The students' results are shown in **Table 1.**

Table 1

Number of leaves removed from the plant shoot	Mean rate of water uptake / cm³ per minute
0	0.10
2	0.08
4	0.04
6	0.02
8	0.01

Explain the relationship between the number of leaves removed from the plant shoot and the mean rate of water uptake.

[3 marks]

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0 8 . 1 Aphids are small insects which feed on the phloem sap of plants.

Explain why aphids are important in transmitting plant viruses.

[2 marks]

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Scientists investigated how being infected with a virus affected the aphids' selection of a new host plant.

- They placed 50 aphids on a platform
- The aphids had access to a leaf from an infected plant and a leaf from a health plant
- The number of aphids on each leaf was counted every 12 hours over a period of 72 hours
- The investigation was conducted with aphids carrying the virus and then repeated with aphids that were not carrying the virus.

Figure 8 shows the apparatus used.

Figure 8

Aphids placed on platform and presented with leaves from both plants

Infected plant
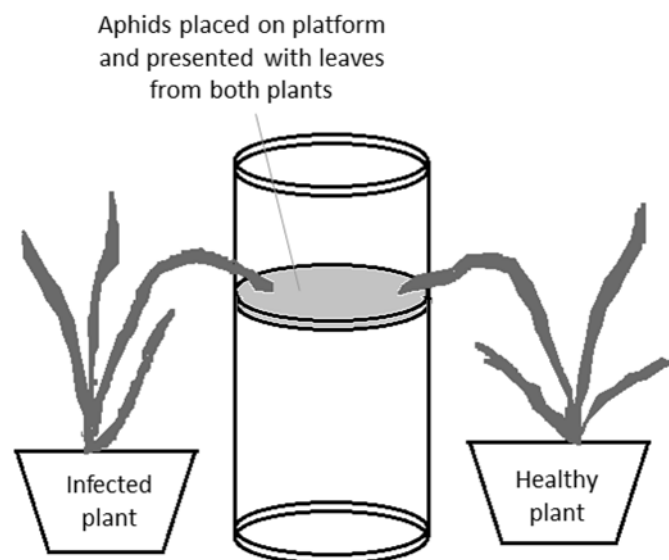
Healthy plant

0 8 . 2 The infected plants were prepared by allowing aphids carrying the virus to feed on them. The healthy plants were prepared by allowing aphids that were not carrying the virus to feed on them.

Explain why the healthy plants were prepared this way.

[2 marks]

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Figure 9 shows the mean number of aphids found on each leaf. The bars show the standard deviation.

Figure 9
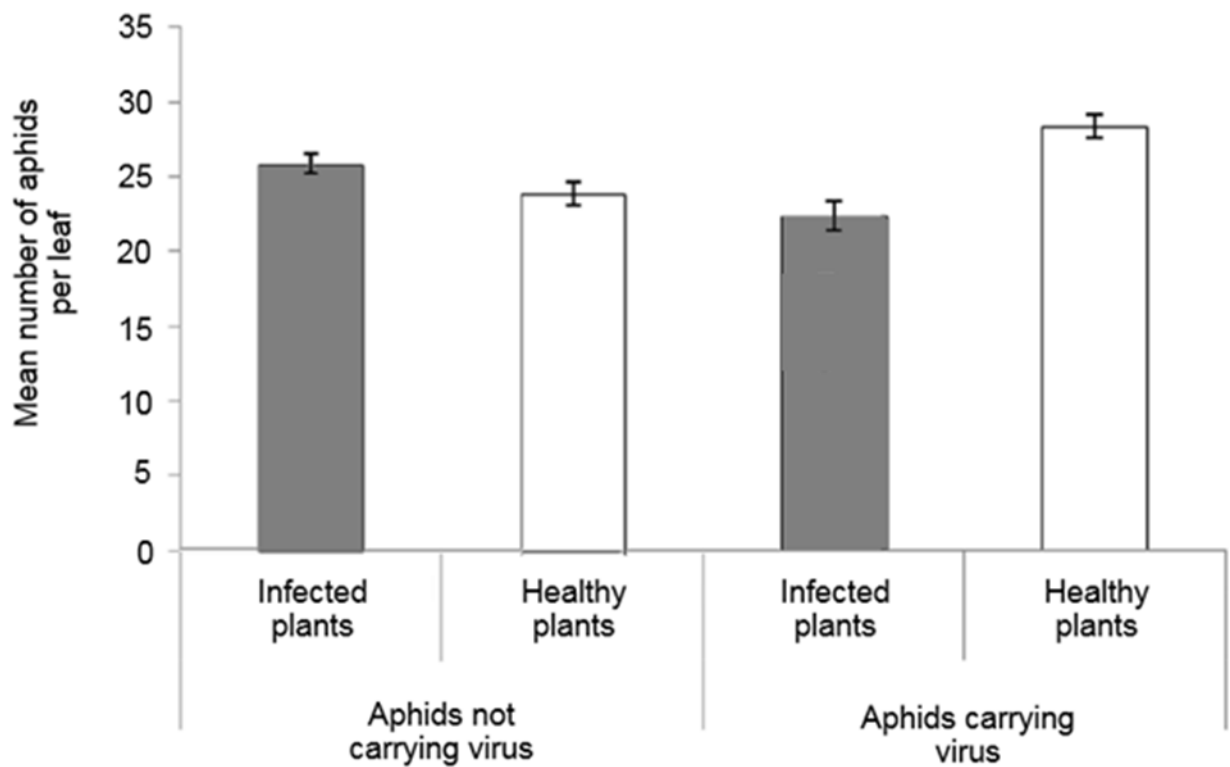
| 0 | 8 | . | 3 | What conclusions can be drawn from the data in the graph?

[2 marks]

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| 0 | 8 | . | 4 | Suggest how the behaviour of the aphids helps to transfer the virus.

[2 marks]

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Turn over for next question

0 9 . 1 When a pathogen enters the body it may be destroyed by phagocytosis. Describe how.

[5 marks]

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0 9 . 2 Vaccines protect people against disease. Explain how.

[5 marks]

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END OF QUESTIONS