UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

1516010872

BIOLOGY **0610/22**

Paper 2 Core **October/November 2012**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

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1	
2	
3	
4	
5	
6	
7	
8	
9	
Total	

This document consists of **19** printed pages and **1** blank page.

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1 Animals without backbones are classified into a number of groups.

Draw **one** line from each of the named groups to its description.

group	description
annelids	hard, jointed exoskeleton, three pairs of jointed legs
insects	long cylindrical body, segmented, has bristles but no legs
molluscs	long cylindrical body, not segmented, no legs
myriapods	has soft body, head and muscular foot, most have a hard shell
nematodes	exoskeleton, segmented body, jointed legs on each segment

[4]

[Total: 4]

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

.....

.....

.....

..... [2]

(ii) Name the main substance that is excreted in expired air.

..... [1]

(iii) Urine contains water. Name **two** other excretory products found in the urine of a healthy person.

..... and ..... [1]

(b) Fig. 2.1 shows the kidneys and associated structures.

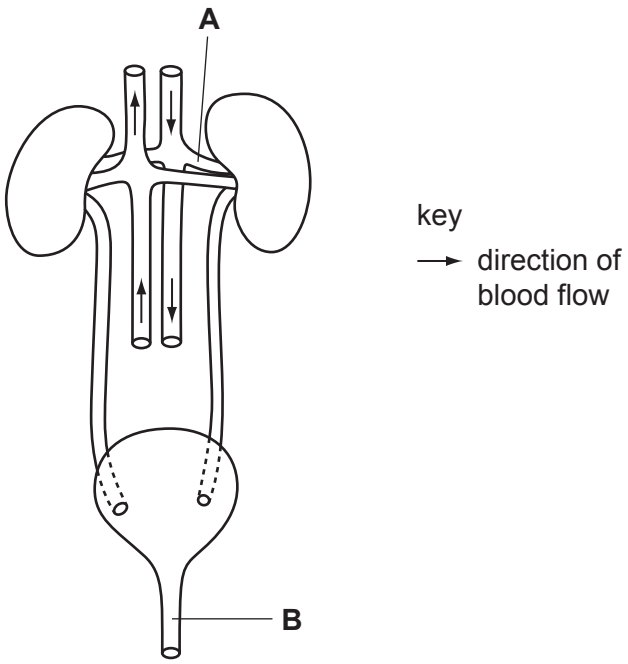

Fig. 2.1

Name the structures labelled **A** and **B**.

A .....

B ..... [2]

(c) In the digestive system, proteins are digested into amino acids.

Describe what happens to any of these amino acids that are in excess, **and** how their breakdown product is removed from the body.

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 10]

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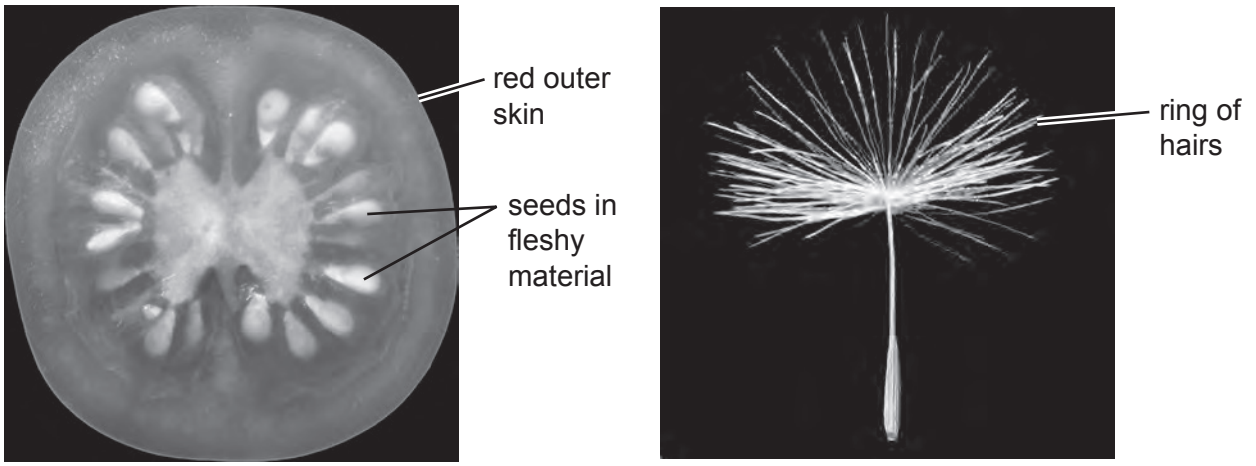
3 **(a)** Fig. 3.1 shows the fruits of two species of plants.



tomato fruit dandelion fruit

Fig. 3.1

Suggest and explain how seeds from each of these two plants are transported away from the parent plant.

tomato .....

.....

.....

..... [2]

dandelion .....

.....

.....

..... [2]

(b) Explain why it is important that seeds are transported well away from the parent plant.

.....

.....

.....

.....

.....

..... [3]

[Total: 7]

For Examiner's Use

4 Table 4.1 shows the percentage of each of the gases present in the atmosphere and in expired air.

Table 4.1

gas	% of atmospheric air	% of expired air
carbon dioxide	0.04	4.00
oxygen	21.00	16.00
X	78.00	78.00
other gases	0.96	2.00

(a) Identify gas **X**.

.....[1]

(b) Fig. 4.1 shows the volume of air exchanged during each breath at rest and during vigorous exercise.

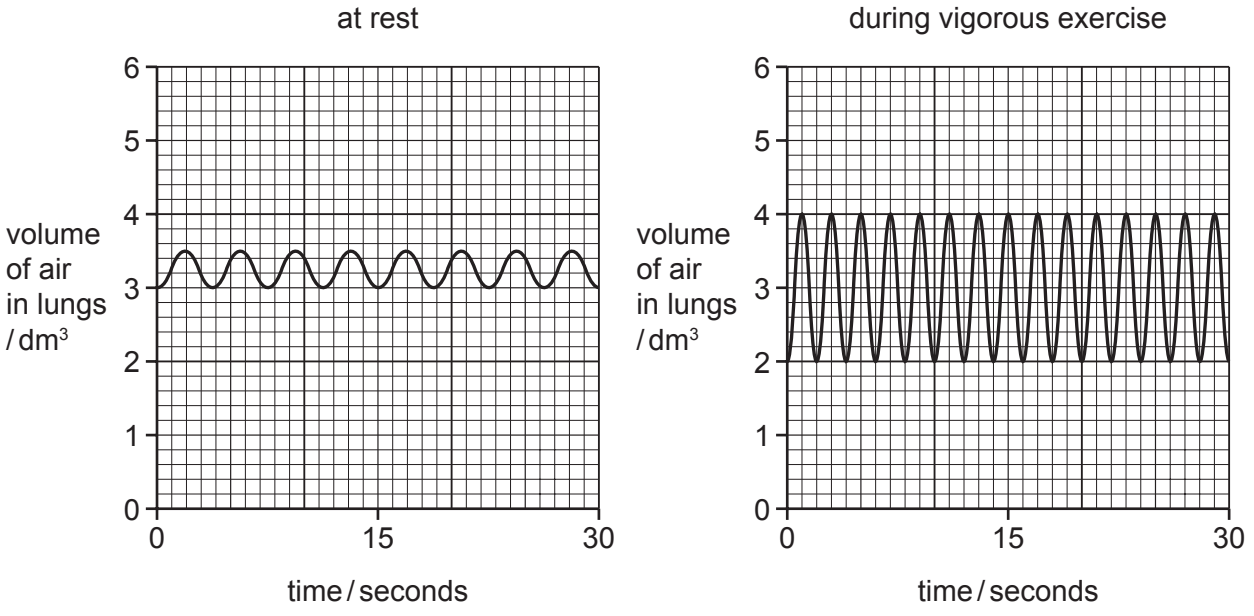


Fig. 4.1

(i) State the volume of air inhaled in each breath at rest.

.....dm^3 [1]

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(ii) State how many breaths are taken in one minute at rest.

..... [1]

(iii) Calculate the volume of air exchanged in one minute at rest.

..... dm^3 [1]

(iv) Using information from Table 4.1, calculate the volume of oxygen absorbed in one minute at rest.

Show your working.

..... dm^3 [2]

(c) (i) Describe what happens to both the rate and depth of breathing during vigorous exercise.

.....

..... [1]

(ii) Suggest why the changes in the rate and depth of breathing are important for the person doing exercise.

.....

.....

.....

..... [2]

(iii) Suggest why the person's heart rate also changes during exercise.

.....

.....

.....

.....

.....

..... [3]

[Total: 12]

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[Turn over

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5 Fig. 5.1 shows a food web that is part of an ecosystem in the Amazon rainforest.

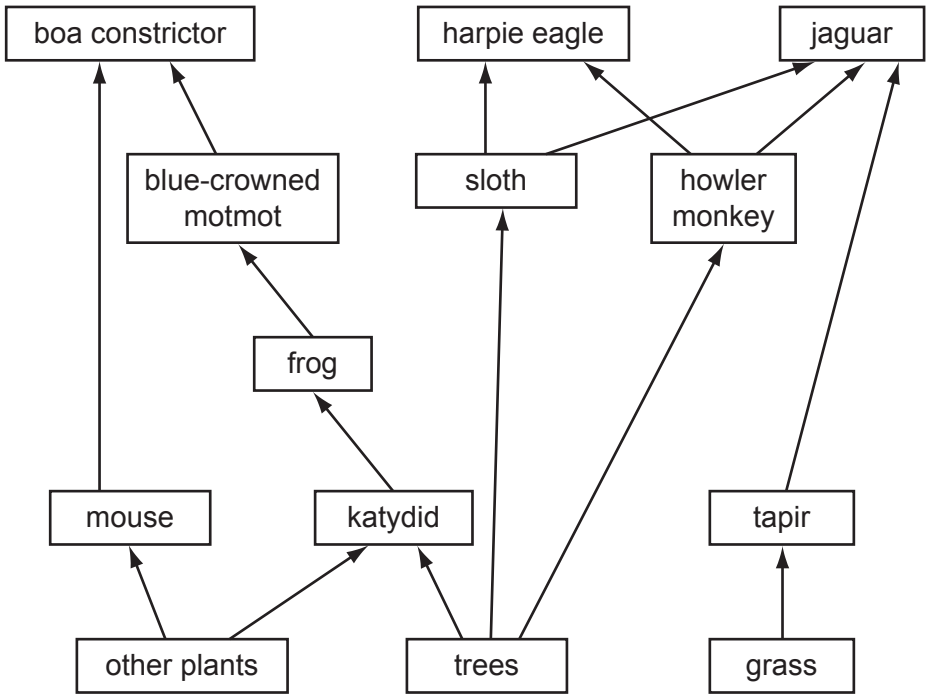

Fig. 5.1

(a) (i) Explain why the whole food web depends on the producers such as the grass and trees.

.....

.....

.....

.....

..... [3]

(ii) Name **two** herbivores in this food web.

1 .....

2 ..... [1]

(iii) State the trophic level of the frog.

..... [1]

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(iv) Complete a food chain of five stages from this food web.

[2]

(b) Jaguars are big cats that are hunted for their fur.

Suggest and explain how the numbers of eagles might be affected if the jaguars were removed from this food web.

.....

.....

.....

..... [2]

(c) Suggest how humans who live in the Amazon rainforest might be affected if large areas of trees are removed.

.....

.....

.....

..... [2]

[Total: 11]

For Examiner's Use

6 Fig. 6.1 shows a human fetus developing inside a uterus.

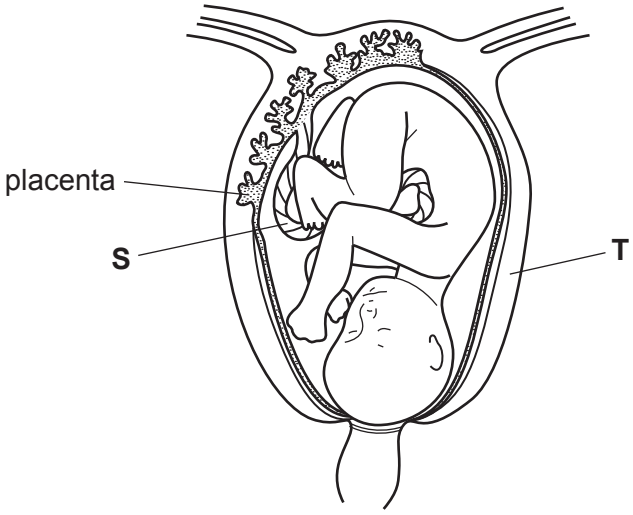

Fig. 6.1

(a) (i) Name the structures labelled **S** and **T**.

S .....

T ..... [1]

(ii) Explain the function of the placenta in the healthy development of the fetus.

.....

.....

.....

.....

.....

..... [3]

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(iii) The blood supply of the mother and of the fetus are kept separate from each other at the placenta.

Suggest and explain two reasons why these two blood systems must not be joined to each other.

1 .....

.....

.....

.....

2 .....

.....

.....

..... [4]

Fig. 6.2 shows a family tree in which the inherited condition beta thalassaemia occurs.

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Beta thalassaemia is caused by a recessive allele, **b**. It results in the formation of haemoglobin that carries less oxygen than normal haemoglobin.

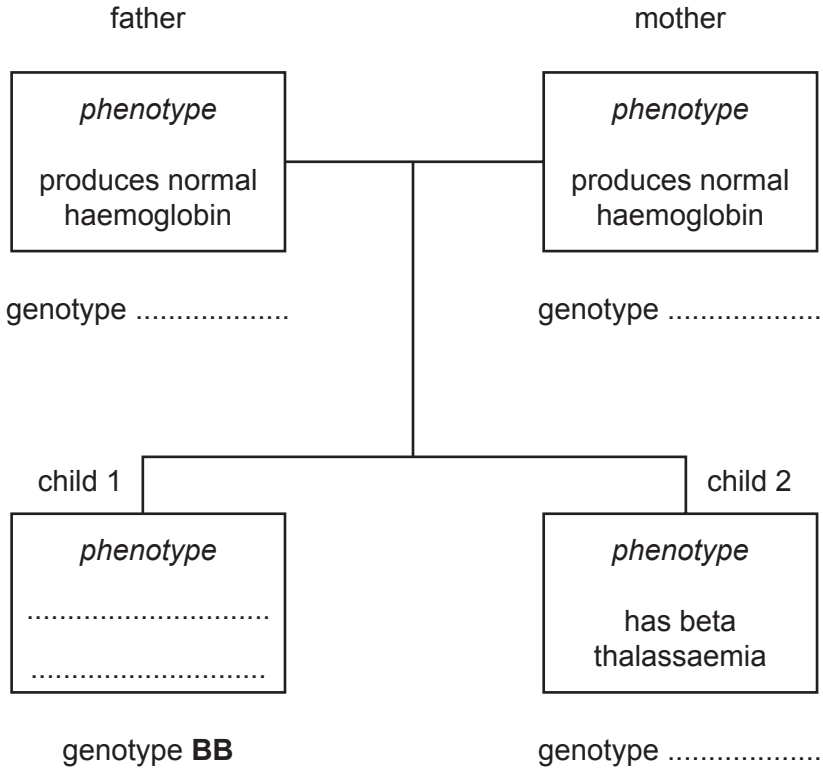

Fig. 6.2

(b) Complete the diagram to show the phenotype of child 1. [1]

(c) Use the symbols **B** and **b** to complete the diagram to show:

(i) the genotype of child 2; [1]

(ii) the genotype of the father; [1]

(iii) the genotype of the mother. [1]

(d) State which **two** people in this family are heterozygous for the condition.

..... and ..... [1]

[Total: 13]

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7 Fig. 7.1 shows the water cycle.

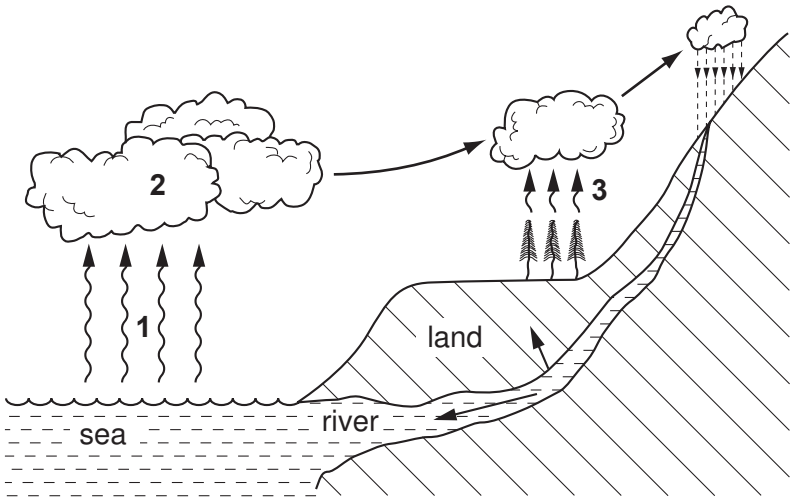

Fig. 7.1

(a) Name the processes that are happening at points **1**, **2** and **3** in the water cycle.

1 .....

2 .....

3 ..... [3]

(b) On mountains, rainwater drains over the surface and sinks into the soil.

Explain why the soil on mountainsides may be poor for agriculture.

.....

.....

.....

..... [2]

[Total: 5]

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8 Fig. 8.1 shows a section through a leaf.

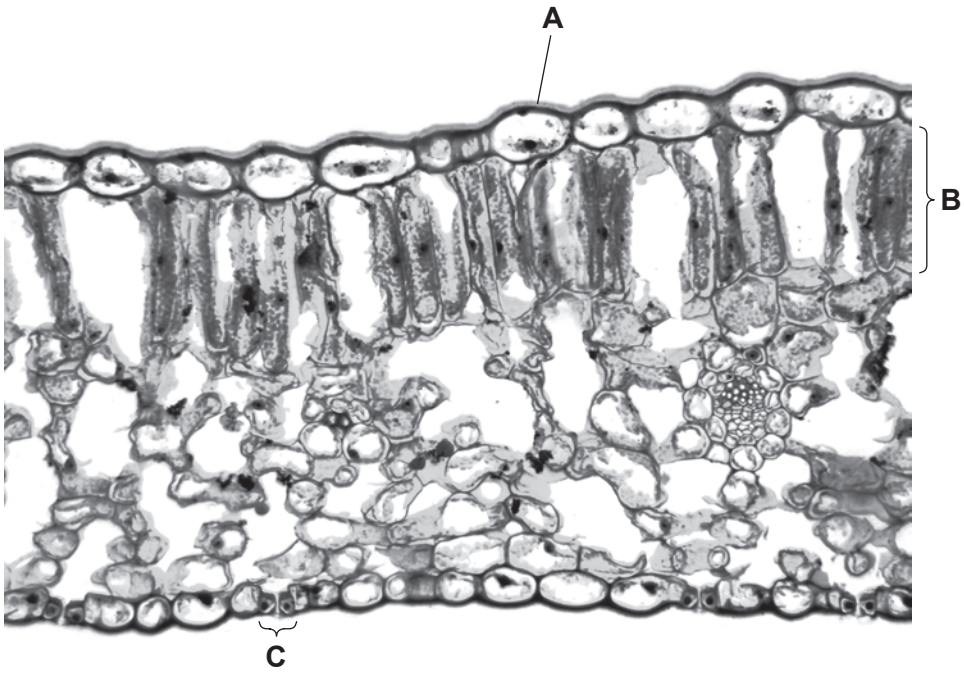

Fig. 8.1

(a) (i) Name layers **A** and **B**.

A .....

B ..... [2]

(ii) State a function of layer **A**.

.....

..... [1]

(iii) Describe the function of **C**.

.....

..... [1]

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(b) Measurements were made of the mass of water taken in and lost by a plant every two hours for 24 hours.

Fig. 8.2 is a graph showing the mass of water lost from the plant by transpiration.

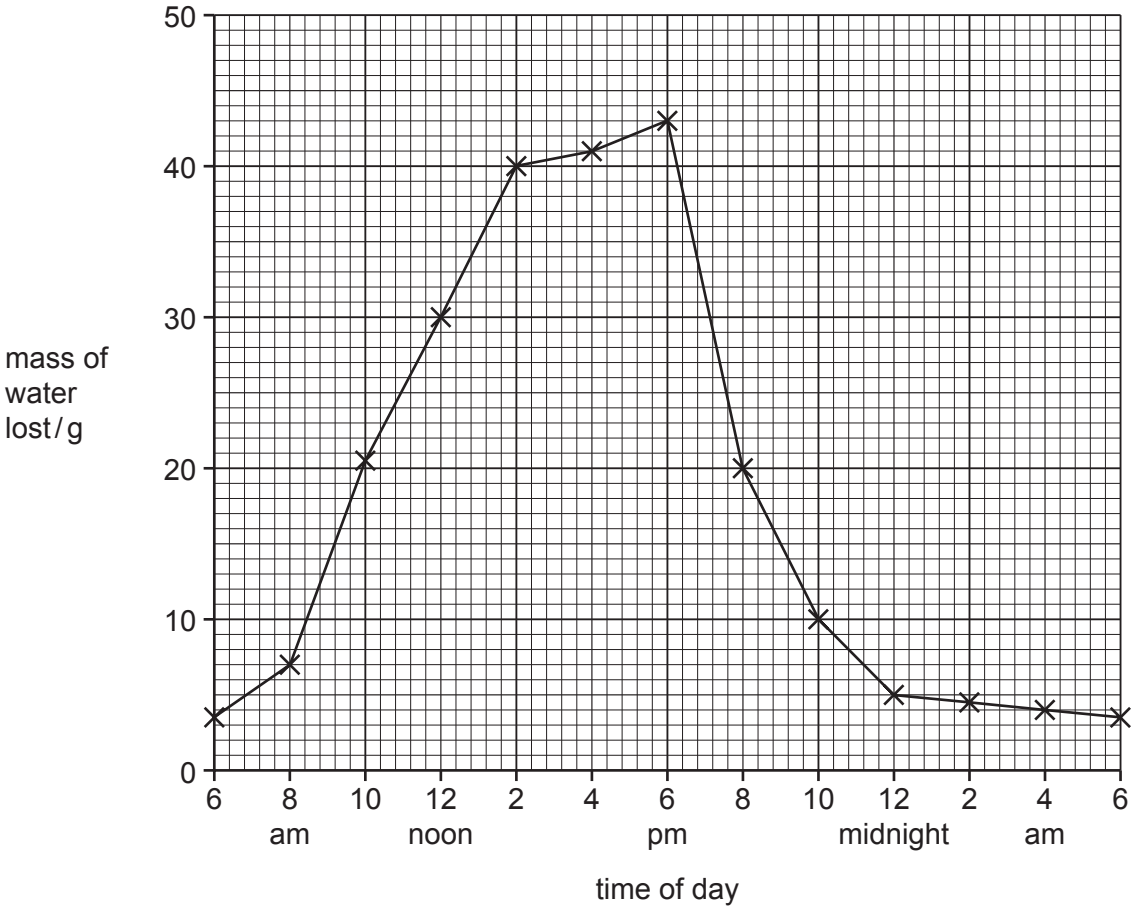

Fig. 8.2

(i) Use the graph, Fig. 8.2, to state the time when the mass of water lost was greatest.

..... [1]

Table 8.1 shows the mass of water taken in by the plant every two hours. Some of the data has been plotted in Fig. 8.3.

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Table 8.1

time of day	mass of water taken in by plant / g
6 am	plotted
8 am	plotted
10 am	22
12 noon	40
2 pm	50
4 pm	44
6 pm	30
8 pm	10
10 pm	plotted
12 midnight	plotted
2 am	plotted
4 am	plotted
6 am	plotted

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Fig. 8.3 shows the mass of water lost and the mass of water taken in by the plant during the same period.

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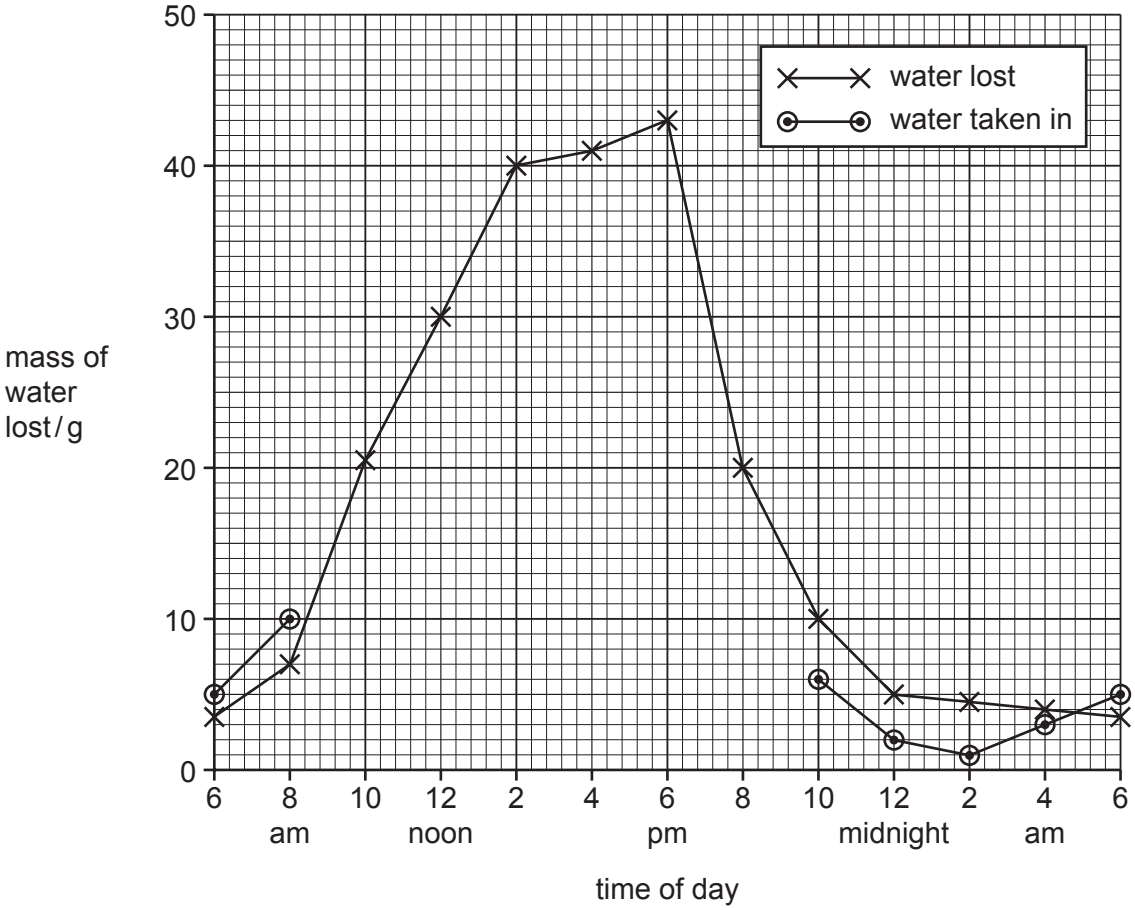

Fig. 8.3

(ii) Complete the graph, Fig. 8.3, to show the mass of water taken in by the plant from 8 am to 10 pm.

Draw your graph on Fig. 8.3. [2]

(iii) State the period of time during which water taken in was less than water lost.

..... [1]

(iv) Describe the state of the stomata between 6 am and 2 pm.

..... [1]

(v) Suggest **one** factor that caused the state in **(b)(iv)**.

..... [1]

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[Turn over

(vi) Name and explain **one** factor, other than your answer to **(b)(v)**, that might increase the loss of water from a leaf during the day.

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.....

.....

.....

.....

.....

..... [3]

[Total: 13]

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9 Table 9.1 shows the percentage of the main types of foods in the diet of two teenage girls. One girl lives in Great Britain and the other girl in sub-Saharan Africa.

Table 9.1

food type	girl in Great Britain % of diet	girl in sub-Saharan Africa % of diet
cereals	15.0	75.0
fruit and vegetables	35.0	15.0
milk and cheese	15.0	7.5
eggs, fish and meat	30.0	2.5
sweets and sugar	5.0	0.0

(a) Compare the percentage of foods rich in fats in the two diets.

.....

..... [1]

(b) Suggest how the lack of sweets and sugar in the diet of the African girl might benefit her health.

.....

.....

.....

..... [2]

(c) The diet of the African girl contains much less protein than that of the British girl. Suggest and explain **one** way in which a diet containing little protein might affect her physical development.

.....

.....

.....

..... [2]

[Total: 5]

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