UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

6155101680

BIOLOGY **0610/23**

Paper 2 Core **October/November 2013**

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.

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

BLANK PAGE

1 The seven characteristics of living organisms are **excretion**, **growth**, **movement**, **nutrition**, **reproduction**, **respiration** and **sensitivity**.

Complete Table 1.1 below by writing the characteristic opposite its definition.

Table 1.1

definition	characteristic
a set of chemical reactions that breaks down nutrients to release energy in living cells	
the ability to detect stimuli and make appropriate responses	
an act causing a change of position or place	
removal from an organism of toxic materials, the waste products of metabolism or substances in excess of requirements	

[4]

[Total: 4]

2 Pepper plants can be grown in glasshouses, where extra light can be supplied from electric lamps.

The amount of carbon dioxide in the air inside a glasshouse was measured on two different days, **M** and **N**. On one of these days the lamps could not be used, because there was no electricity.

Fig. 2.1 shows the amount of carbon dioxide in the air around the pepper plants on day **M** and day **N**.

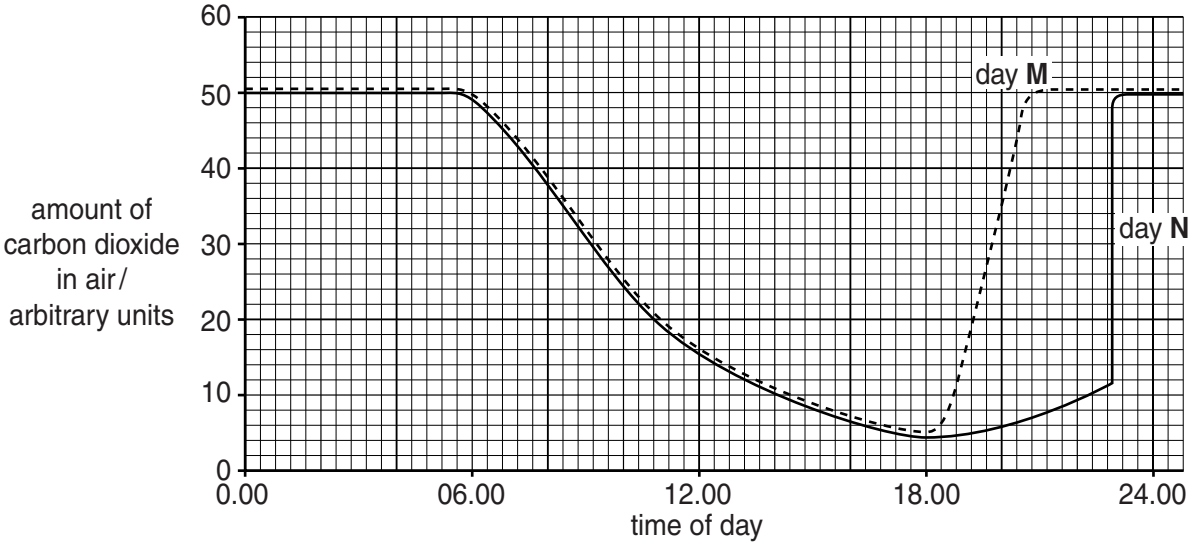


Fig. 2.1

(a) (i) Name the process, used by plants, that removes carbon dioxide from the air.

.....[1]

(ii) State the time of day by which the pepper plants had removed most of the carbon dioxide.

.....[1]

(iii) Using the data from Fig. 2.1, explain how you know that there was no electricity on day **M**.

.....

.....

.....[2]

(b) The amount of carbon dioxide and the availability of light affect the growth of pepper plants.

Suggest **two** other factors that affect the growth of pepper plants.

1 .....

2 .....[2]

(c) The pepper grower wanted to find out whether the peppers he grew contained sugar and vitamin C.

(i) State **two** reasons why too much sugar can be harmful to humans.

1 .....

2 .....[2]

(ii) State **one** reason why humans need vitamin C in their diet.

.....[1]

[Total: 9]

3 Fig. 3.1 shows part of the human arm.

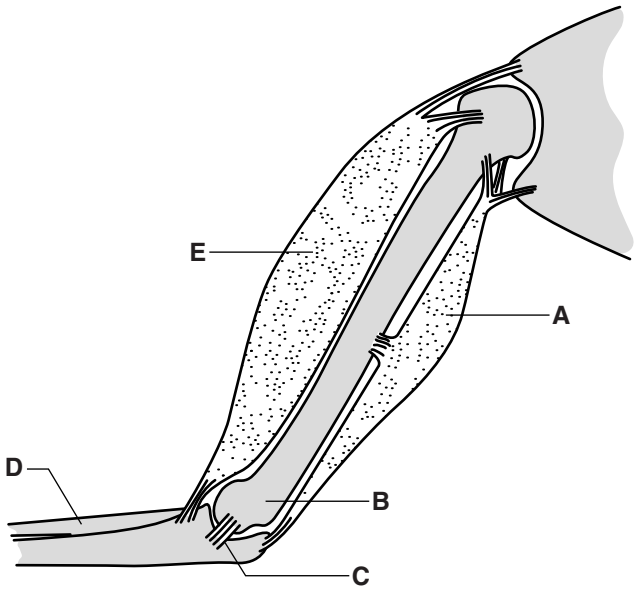


Fig. 3.1

(a) State which letter shows:

the biceps; ..... [1]

the triceps. ..... [1]

(b) State which letter shows a structure that contracts to extend (straighten) the arm at the elbow.

..... [1]

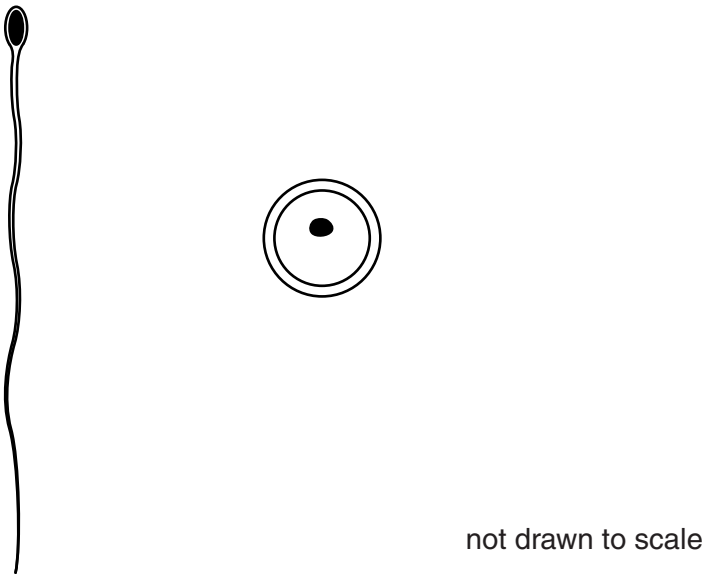
(c) Explain what is meant by *antagonistic muscles.*

.....

.....[1]

[Total: 4]

4 Fig. 4.1 shows a human sperm and egg.



not drawn to scale

Fig. 4.1

(a) The sperm and the egg have some similarities and some differences.

(i) Describe one **similarity** related to the function of these cells as gametes.

.....[1]

(ii) Describe **one** difference between the sperm and the egg.

.....[1]

State why this difference is important to the function of these cells.

.....[1]

(b) The sperm and egg can fuse to form another type of cell.

This process is shown in Fig. 4.2.

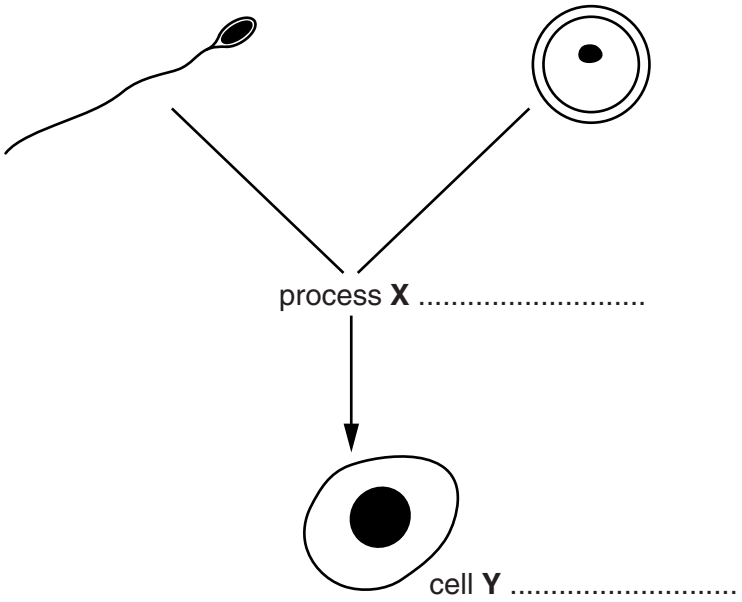


Fig. 4.2

(i) Write the name of the process **X** on the line provided. [1]

(ii) Write the name of the new type of cell **Y** on the line provided. [1]

(c) (i) Name the organ where human sperm are made.

.....[1]

(ii) Describe the route by which sperm reach the egg.

.....

.....

.....

.....

.....

.....[3]

(d) Certain types of nutrient are needed in especially large amounts during the development of a young human.

Table 4.1 shows some nutrients which are particularly important at different stages of growth and development.

The amounts are shown as 'relative food units' per kg of body mass. A high value for the 'relative food unit' means that a nutrient is especially important.

Table 4.1

	relative food units		
nutrient	fetus	young child (7–9 years)	girl at puberty
carbohydrate	97	198	115
fat	63	50	41
protein	51	51	52
calcium	190	95	72
iron	99	106	220

Use Table 4.1 to identify which nutrient is required in the greatest amount at each stage of development.

State **one** reason why each of these nutrients is important.

Fetus:

most important nutrient .....[1]

reason why nutrient important .....[1]

Young child (7–9 years):

most important nutrient .....[1]

reason why nutrient important .....[1]

Girl at puberty:

most important nutrient .....[1]

reason why nutrient important .....[1]

[Total: 15]

5 Malnutrition is caused by some imbalance in the diet or lifestyle.

(a) This is a list of some effects of malnutrition.

constipation **coronary heart disease** **obesity**

starvation **tooth decay**

Use the list to complete Table 5.1.

Table 5.1

imbalance in diet	effect of malnutrition
insufficient fibre	
insufficient fat and carbohydrate	
high fat diet combined with a low exercise lifestyle	

[3]

(b) In some parts of the world, the **supply** of food does not match the **demand** for food.

Describe **two** ways in which technology has helped farmers to grow more food.

1 .....

.....

2 .....

.....[2]

[Total: 5]

6 Alcohol is a widely used drug.

It has serious effects on many parts of the body, including the nervous system.

(a) **(i)** Name the organ in the body where alcohol is broken down.

.....[1]

(ii) Suggest how alcohol reaches the brain.

.....[1]

(b) Doctors are concerned that young people in some countries are drinking too much alcohol.

Fig. 6.1 shows the percentage of young people who drink alcohol in a city in one of these countries.

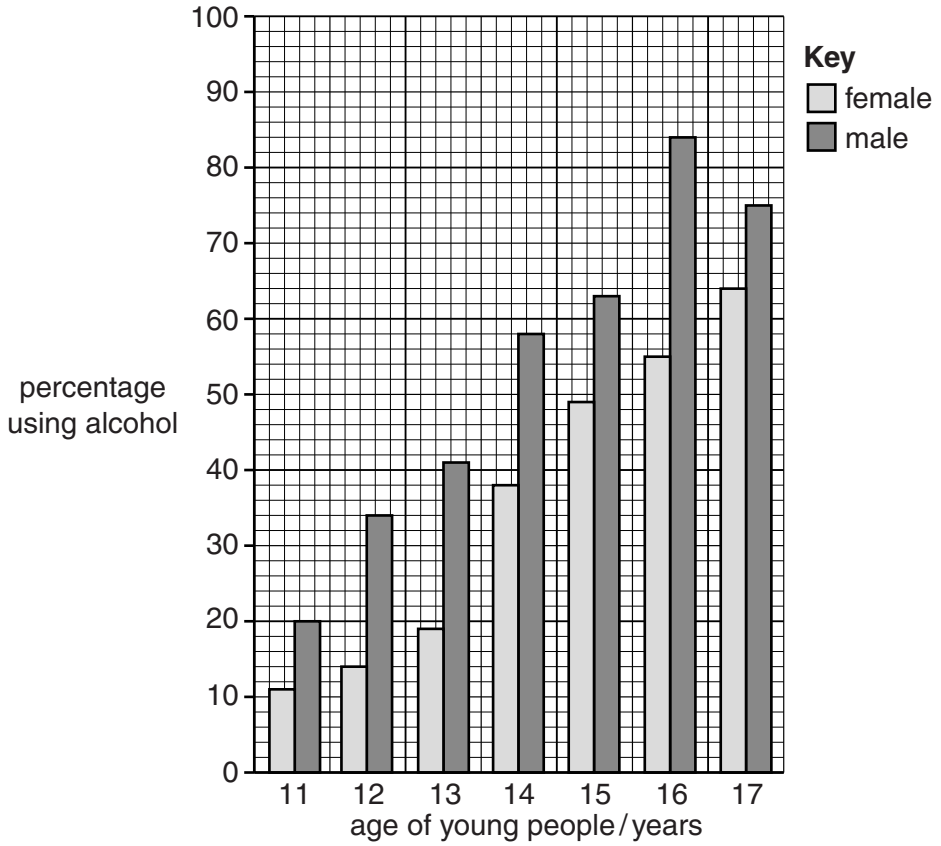


Fig. 6.1

(i) There is a difference in the percentage of males and females who drink alcohol.

State the age at which this difference is greatest.

..... [1]

(ii) It is not safe to drive a car or motorbike after drinking large amounts of alcohol.

Explain why.

.....

.....

.....

.....[2]

(c) There are many other social problems caused by young people drinking alcohol.

Describe **three** examples of social problems, other than unsafe driving.

.....

.....

.....

.....

.....

.....[3]

[Total: 8]

7 Fig. 7.1 shows a food web in a rainforest.

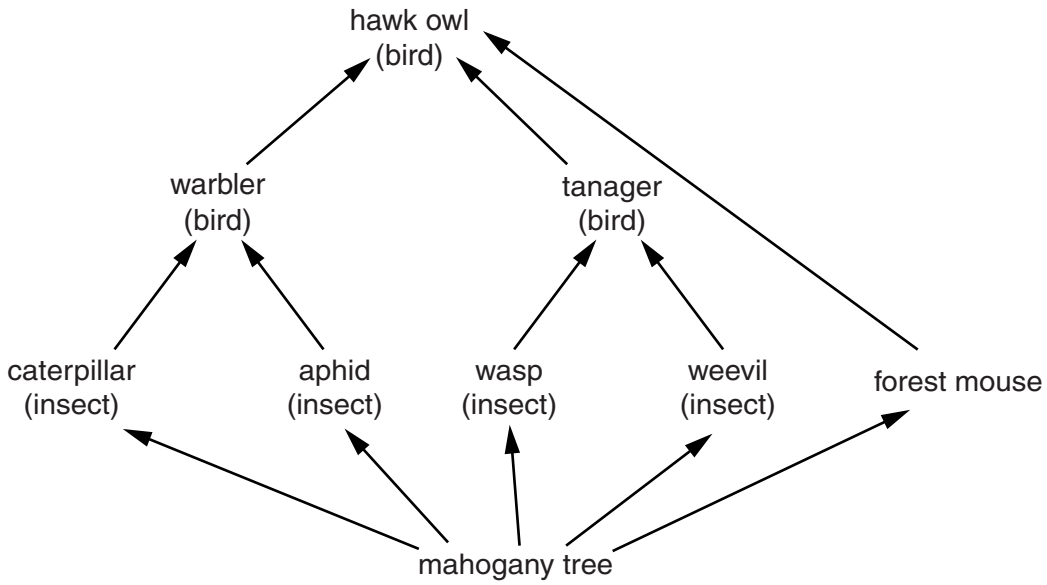


Fig. 7.1

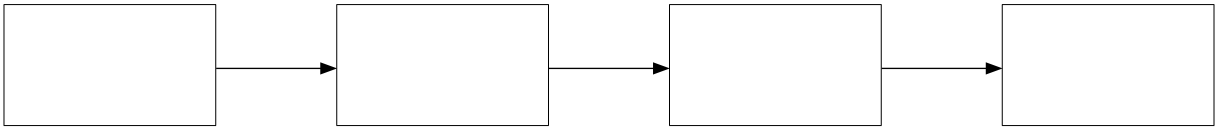
(a) (i) Name the organism in the food web shown in Fig. 7.1 which can trap light energy to produce sugars.

.....[1]

(ii) Name **one** secondary consumer in this food web.

.....[1]

(iii) Complete one food chain from this food web. Write the name of one organism in each box.



[2]

(iv) What do the arrows in the food chain represent?

.....[1]

(b) Some local people were paid to catch warblers for the pet trade.

Explain why the number of tanagers and forest mice might get smaller if all of the warblers were removed from the forest.

.....

.....

.....

.....[2]

(c) A group of scientists observed the animals in the forest.

Table 7.1 shows the average number of each type of animal in one mahogany tree.

Table 7.1

animal	trophic level	number of animals
hawk owl	4	2
tanager	3	4
warbler	3	5
aphid	2	36
caterpillar	2	42
weevil	2	13
wasp	2	7
forest mouse	2	2

(i) Use information from Table 7.1 to calculate the total number of animals at each trophic level.

Write your answers in Table 7.2.

Table 7.2

trophic level	number of animals
2	
3	
4	

[1]

(ii) Use information from Tables 7.1 and 7.2 to draw a *pyramid of numbers* for this food web.

[2]

(d) Many scientists believe that a *pyramid of biomass* is more useful than a pyramid of numbers.

Suggest which extra information would be needed to draw a pyramid of biomass.

.....

.....[1]

[Total: 11]

8 **(a)** Fig. 8.1 shows part of the water cycle.

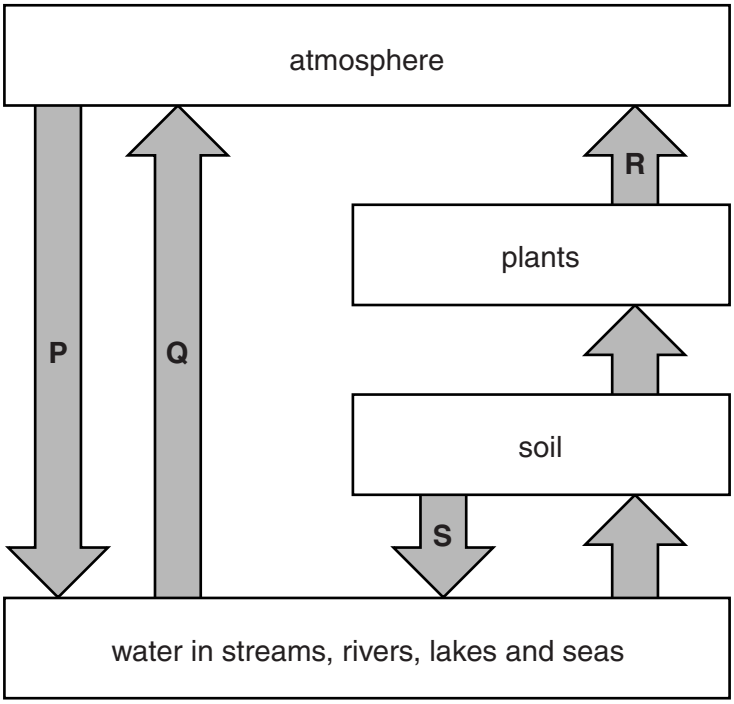


Fig. 8.1

Using words from the list, identify the processes **P**, **Q**, **R** and **S**.

drainage **egestion** **evaporation**

photosynthesis **rainfall** **transpiration**

P .....

Q .....

R .....

S .....
[4]

(b) **(i)** State **two** ways in which water may leave the body of a mammal.

1 .....

2 .....[2]

(ii) Describe how water in a plant may become water in the cells of an animal.

.....

.....

.....

.....

.....

.....[3]

(c) Fig. 8.2 shows apparatus which can be used to measure the rate of water uptake by a plant shoot.

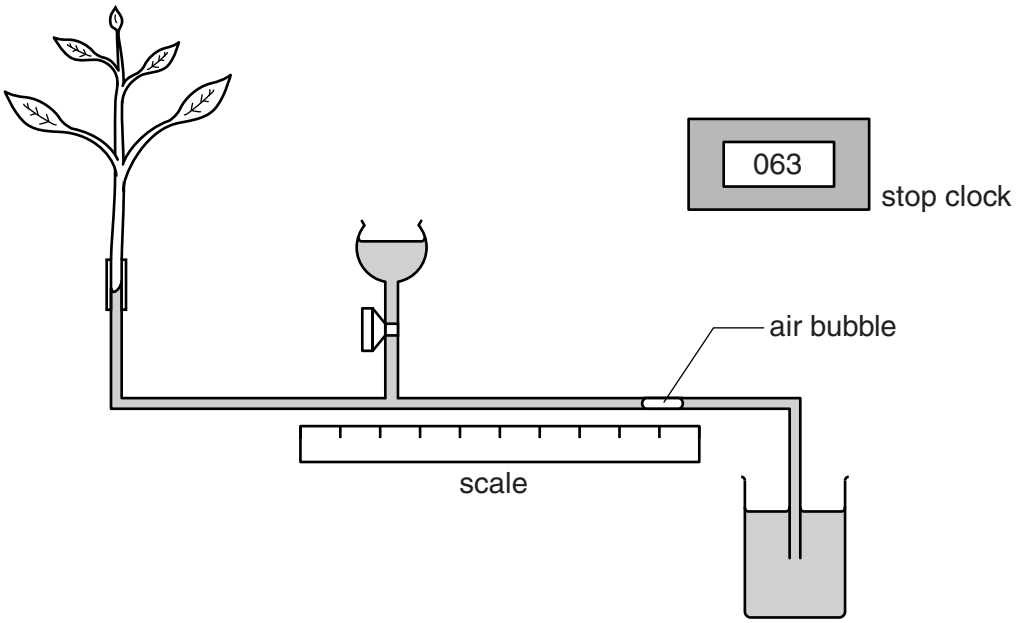


Fig. 8.2

Three sets of this apparatus, using shoots from the same tree, were used at the same time.

The experiment was carried out with four different sets of external conditions **A**, **B**, **C** and **D**. The time for the air bubble to move 10 cm was measured and recorded in Table 8.1.

Table 8.1

	external conditions	time for air bubble to move 10 cm / s		
		shoot 1	shoot 2	shoot 3
A	dry, still air at 15 °C	25	46	33
B	dry, still air at 25 °C	19	37	31
C	dry, moving air at 25 °C	16	32	27
D	humid, still air at 15 °C	58	78	70

(i) State which shoot took up water most quickly under all conditions.

.....[1]

(ii) Suggest a difference between the shoots that could explain these results.

.....

.....[1]

(iii) Suggest why the results under condition **D** were different from the results under condition **A**.

.....

.....

.....

.....[2]

[Total: 13]

9 Coffee is an important crop in some countries.

Coffee plants can be crossed to produce new varieties. A valuable variety would produce a high yield in a range of different habitats.

(a) Explain how two varieties of coffee plant could be crossed (bred together) to produce an improved variety.

.....

.....

.....

.....

.....

.....[3]

(b) Scientists think that they may be able to use genetic engineering to produce valuable new varieties. This involves taking a gene from one species and putting it into another species.

(i) Define the term *gene*.

.....[1]

(ii) Name the part of the coffee plant cells which contains the genes.

.....[1]

(c) New varieties of coffee plant can sometimes appear as a result of a random process.

Name this random process.

.....[1]

(d) Four new varieties were produced. Some of their properties are shown in Table 9.1.

Table 9.1

characteristic of plant	Super Plus	New Mocha	Gro-Better	Lo-Cost
ability to withstand low temperature	high	high	low	low
resistance to insect pests	low	high	very high	very low
height	short	very tall	tall	short
yield without fertiliser	low	medium	high	low

In windy conditions the tall varieties of coffee plants blow over, so yields are very poor.

Name the two varieties in Table 9.1 that would grow best in windy conditions.

1 .....

2 ..... [2]

(e) Yields can also be affected by whether the farmer can afford expensive chemicals such as pesticides and fertilisers.

Name the two varieties in Table 9.1 that would grow best if the farmer could not afford fertiliser.

1 .....

2 ..... [2]

(f) A farm has the conditions shown in Table 9.2.

Use information from Table 9.1 to complete Table 9.2.

Table 9.2

temperature	wind	number of pests	availability of fertiliser	most suitable variety
very cold	not windy	many	only small amounts	

[1]

[Total: 11]