Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

4595524825

BIOLOGY **0610/22**

Paper 2 Core **February/March 2015**

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, 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.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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

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1 Fig. 1.1 shows six different cells. They are not drawn to the same scale.

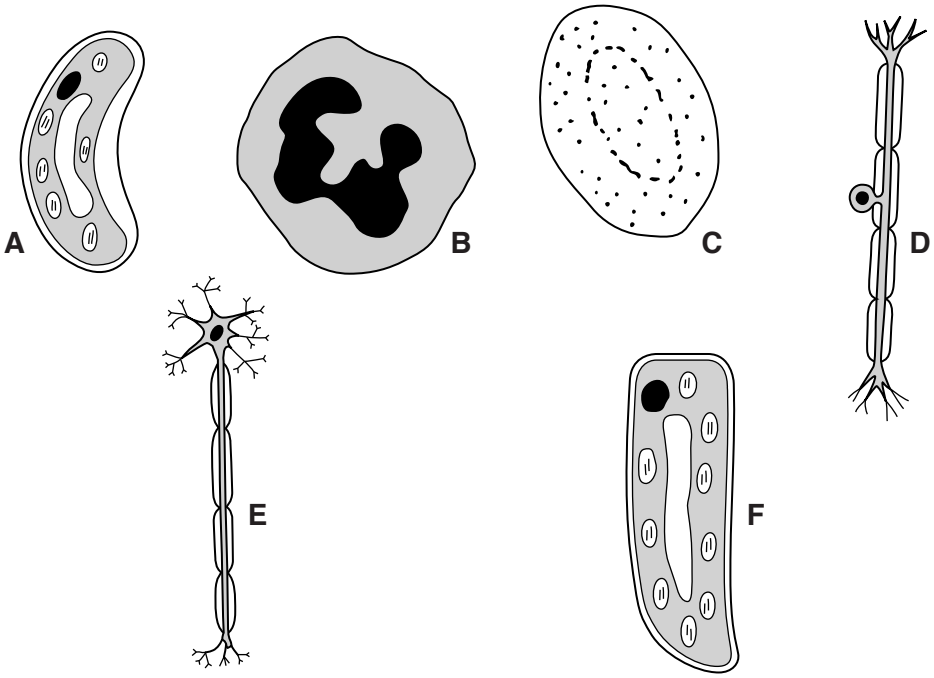


Fig. 1.1

(a) Table 1.1 shows a key which can be used to identify these cells.

Table 1.1

1	cell has a cell wall cell has a membrane but no cell wall	go to 2 go to 3
2	cell wall is of equal thickness all around the cell cell wall is of unequal thickness around the cell	palisade cell guard cell
3	cell has extensions cell has no extensions	go to 4 go to 5
4	nucleus in cell body half way along the length of the cell nucleus in cell body at one end of the cell	sensory neurone motor neurone
5	nucleus is missing from cell nucleus is irregular in shape	red blood cell phagocyte

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Use this key to identify cells **A**, **B**, **C**, **D** and **E**. Cell **F** has been done for you.

Write your answers in Table 1.2.

Table 1.2

letter	type of cell
A	
B	
C	
D	
E	
F	palisade cell

[4]

(b) (i) State the main function of a palisade cell.

..... [1]

(ii) Suggest **and** explain **two** ways in which the structure of a palisade cell is adapted to this function.

adaptation 1 .....

explanation .....

.....

adaptation 2 .....

explanation .....

..... [4]

[Total: 9]

2 Fig. 2.1 shows an apparatus used to study the effect of minerals on plant growth.

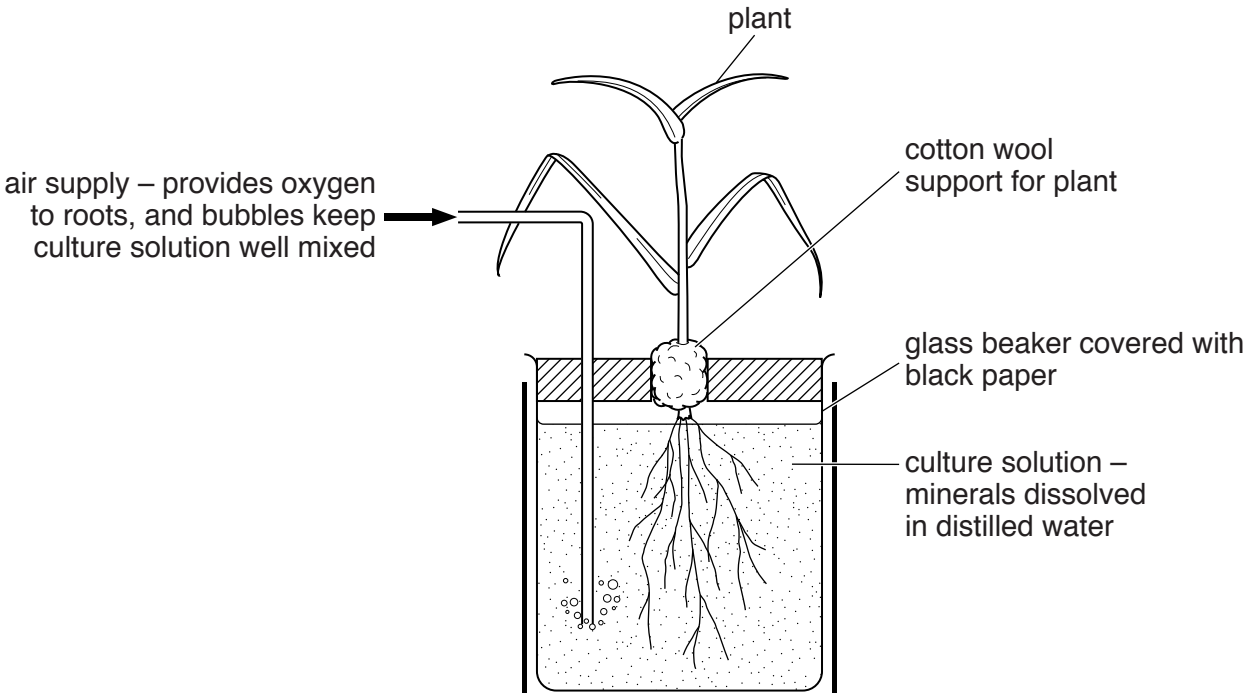


Fig. 2.1

(a) The plant grows better if air is bubbled through the solution surrounding its roots.

Name the process that uses oxygen from the air to release energy in the plant's cells.

..... [1]

(b) An investigation was carried out into bean plants, using the apparatus shown in Fig. 2.1. Table 2.1 shows the mean dry mass of three groups of bean plants grown in different solutions for seven days.

Table 2.1

group	culture solution	mean dry mass of bean plants/g
A	contains all minerals required for growth	9.4
B	does not contain nitrogen	1.7
C	does not contain magnesium	0.8

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(i) Explain why, compared with group **A**, the dry mass was less in group **B** and group **C**.

.....

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..... [4]

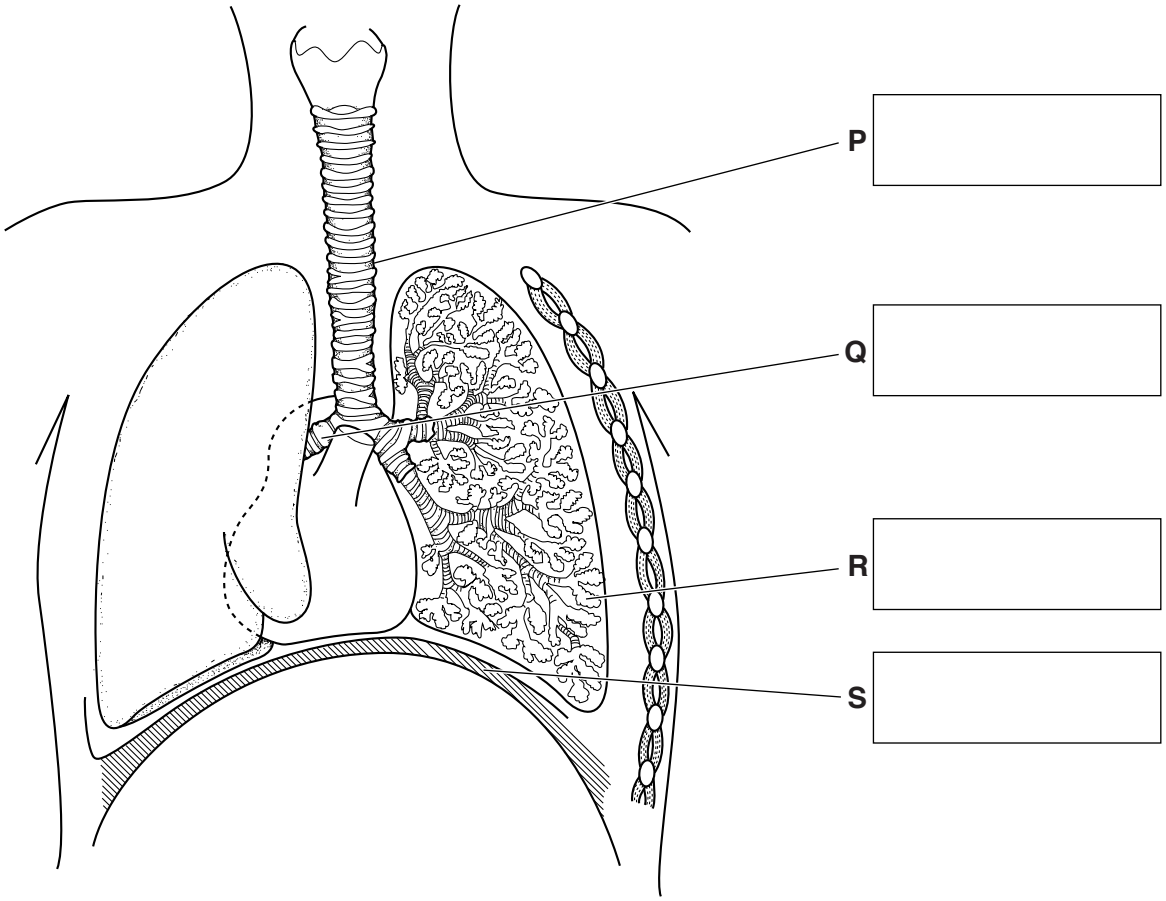
(ii) Describe the expected appearance of plants in group **C** at the end of the investigation.

..... [1]

[Total: 6]

3 **(a)** Fig. 3.1 shows some of the structures present in the human thorax (chest).

Identify the structures labelled **P**, **Q**, **R** and **S**.
Write your answers in the boxes on Fig. 3.1.



[4]

Fig. 3.1

(b) Table 3.1 shows the composition of inspired (inhaled) and expired (exhaled) air.

Table 3.1

gas	inspired air/%	expired air/%
carbon dioxide	0.03	3.90
nitrogen	79.00	79.00
oxygen	20.97	17.10

(i) Expired air has more carbon dioxide then inspired air.

Approximately how many times greater was the percentage of carbon dioxide in the expired air than in the inspired air?
Choose your answer from this list.

×1.3 **×13** **×130** **×1300**

..... [1]

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(ii) There is no difference in the nitrogen content of inspired and expired air.

Suggest a reason for this.

.....

..... [1]

(iii) Expired air often contains more water vapour than inspired air.

Explain how this water vapour gets into the expired air.

.....

.....

.....

..... [2]

(c) Table 3.2 shows the effects of exercise on the rate of oxygen uptake and the rate of energy use.

Table 3.2

type of exercise	rate of oxygen uptake /dm^3 per minute	rate of energy use /kJ per minute
normal walking	1.5	3.0
walking uphill	3.0	5.5
running quickly	5.0	9.0
running at maximum speed	5.0	12.0

(i) Describe what happens to the rate of oxygen uptake as activity increases.

.....

.....

.....

..... [2]

(ii) Use the results in Table 3.2 to calculate how many kilojoules of energy are needed to run quickly for 12 minutes.

..... kJ [1]

(iii) 1 g of sugar provides about 18.0 kJ of energy.

Calculate how much sugar would be needed to run at maximum speed for 30 seconds.

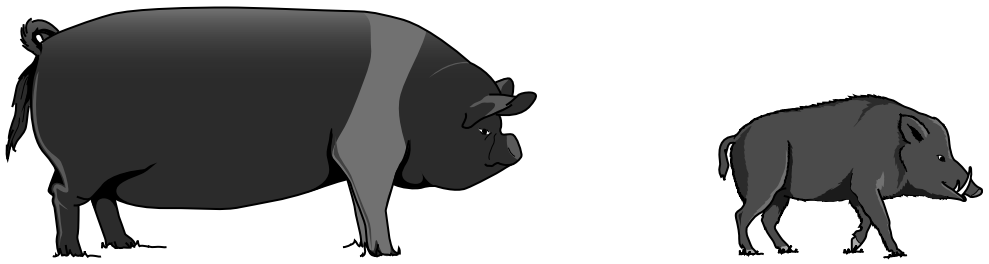
Show your working.

..... g [2]

[Total: 13]

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4 Fig. 4.1 shows a wild pig and a Saddleback pig. The drawings are to the same scale.



Saddleback pig wild pig

Fig. 4.1

(a) The Saddleback pig has been produced from the wild pig by artificial selection (selective breeding).

Suggest **two** useful characteristics, visible in Fig. 4.1, which the farmers selected when breeding the Saddleback pig.

1 .....

.....

2 .....

..... [2]

(b) Explain how the Saddleback pig could have been produced by artificial selection.

.....

.....

.....

.....

.....

..... [3]

(c) There are different varieties of sheep. Some of these varieties have white wool and some have brown wool.

The allele for white wool colour, **N**, is dominant to the allele for brown wool colour, **n**.

A genetic diagram for the result of crossing a white-coloured sheep with a brown-coloured sheep is shown in Fig. 4.2.

Complete the genetic diagram to show how wool colour is inherited in this cross.

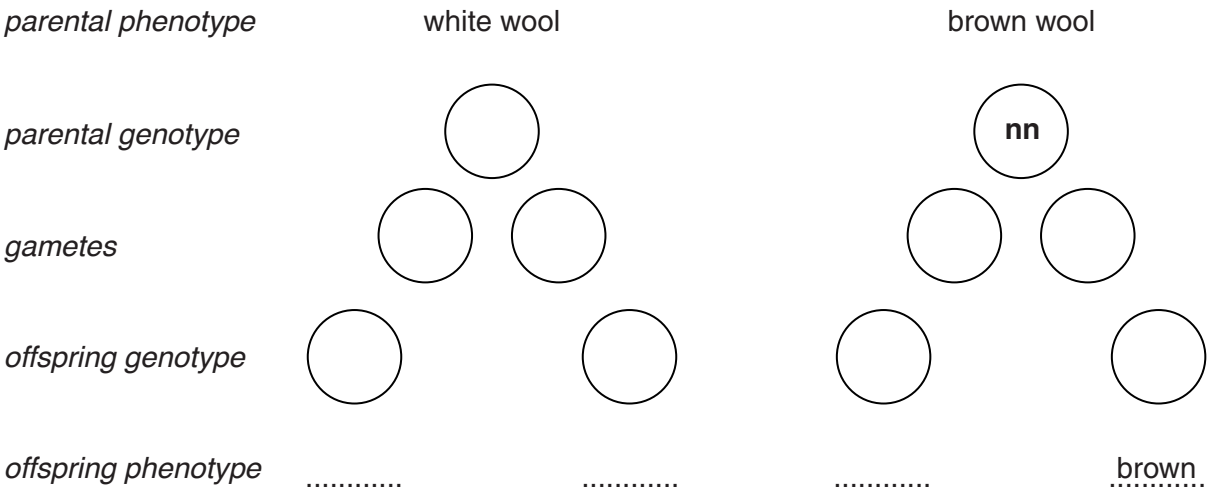


Fig. 4.2 [4]

[Total: 9]

5 **(a)** Fig. 5.1 shows a power station. Power stations release waste gases into the atmosphere when they burn fossil fuels.

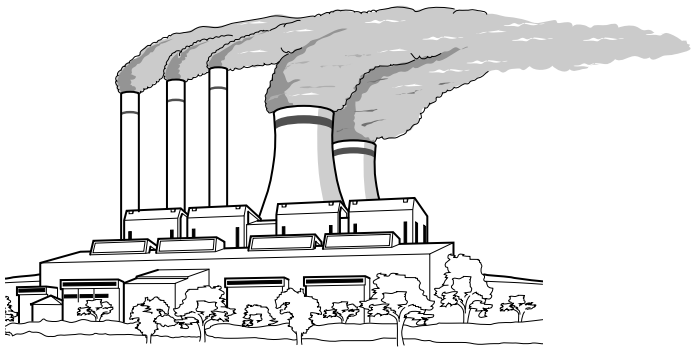


Fig. 5.1

Name **two** gases that cause pollution when released into the atmosphere.
State **one** effect of each of these gases on the environment.

gas .....

effect .....

.....

gas .....

effect .....

..... [4]

(b) In some countries wood is an important fuel. Wood may be collected by cutting down trees in forests.

State **three** undesirable effects of deforestation.

.....

.....

.....

.....

.....

..... [3]

[Total: 7]

6 Fig. 6.1 represents an example of a human menstrual cycle.

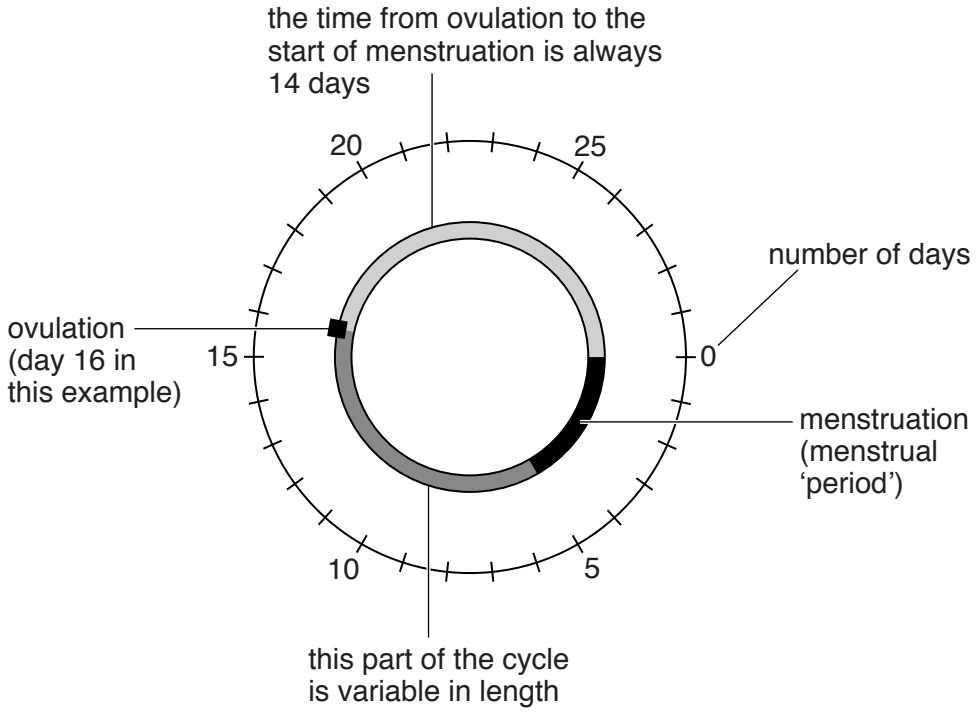


Fig. 6.1

(a) State the part of the menstrual cycle which is always the same length.

..... [1]

(b) (i) A woman's period started on August 2nd and her next period started on August 29th.

Calculate the length of her menstrual cycle for that month.

..... days [1]

(ii) Human sperms can live for up to 48 hours in the female's reproductive system, and human eggs live for 24 hours after release.

Ovulation occurred on 16th August.

State the dates in August on which intercourse could result in fertilisation taking place.

..... August [2]

(c) During menstruation a woman loses blood. This can cause a woman to be anaemic. Symptoms of anaemia are lack of energy, pale colour and tiredness.

Explain how these symptoms can be caused by the blood loss during menstruation.

.....

.....

.....

.....

.....

..... [3]

(d) When a woman becomes pregnant a placenta and umbilical cord will form.

State the names of **three** substances which must be able to pass from the woman to the developing fetus across the placenta.

1 .....

2 .....

3 ..... [3]

(e) In the plant life cycle seeds and fruits are dispersed.

Fig. 6.2 shows an example of a fruit.



Fig. 6.2

(i) Suggest **one** way in which this fruit is adapted so that animals are likely to eat it.

.....

..... [1]

(ii) The animals help to disperse the fruit and seeds.

Suggest **two** advantages of fruit and seed dispersal.

1 .....

.....

2 .....

..... [2]

[Total: 13]

7 Fig. 7.1 shows the human alimentary canal and some of the organs associated with it.

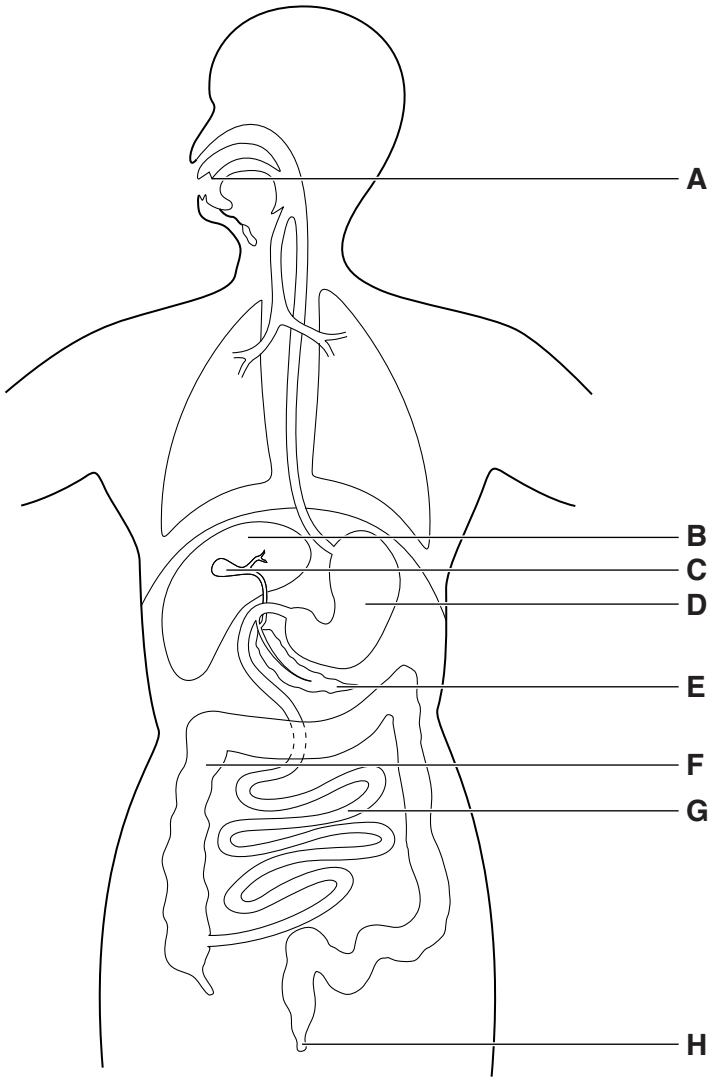


Fig. 7.1

(a) Use letters from Fig. 7.1 to identify which structure carries out a particular function. Write your answers in Table 7.1.

Table 7.1

function	letter
ingestion of food	
bile storage	
fat digestion	
egestion	

[4]

(b) Name the process which moves food from **D** to **F**.

..... [1]

(c) A student investigated the digestion of fats by the enzyme lipase.

He found that as lipase digested the fats, the pH of the solution changed from pH 8 to pH 6.

(i) Explain why the digestion of fats changed the pH of the solution.

.....

.....

.....

..... [2]

(ii) Fig. 7.2 shows three test-tubes that were set up for this experiment.

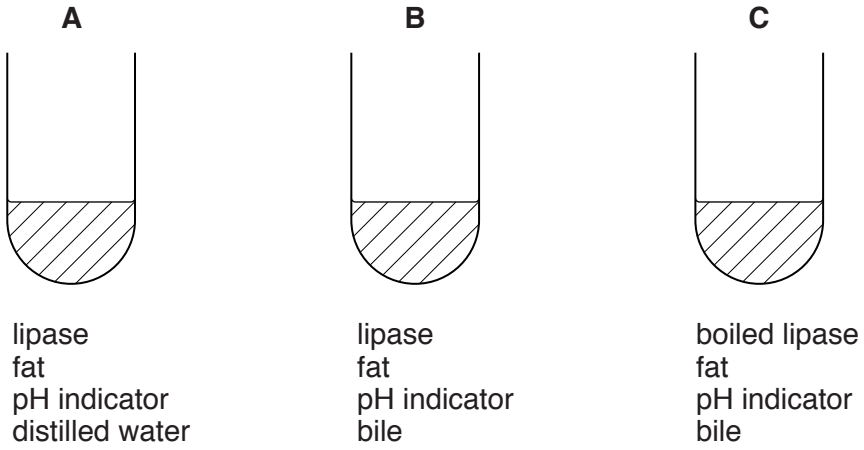


Fig. 7.2

The time taken for the indicator to change colour after the lipase was added was measured. The results are shown in Table 7.2.

Table 7.2

test-tube	time taken to change colour / minutes
A	6.5
B	1.0
C	no change after 25 minutes

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Explain why the indicator in test-tube **B** changes colour much faster than the indicator in test-tube **A**.

.....

.....

.....

.....

.....

..... [3]

(d) Some biological washing powders contain lipase. Instructions on the packet state that biological washing powders should be used in warm water but not in very hot water.

Explain why warm water should be used instead of very hot water. Use Fig. 7.2 and Table 7.2 to help with your answer.

.....

.....

.....

..... [2]

(e) Eating too much fat can be harmful.

State **one** way in which too much fat can be harmful to human health.

..... [1]

[Total: 13]

8 Fig. 8.1 shows a woodland food web.

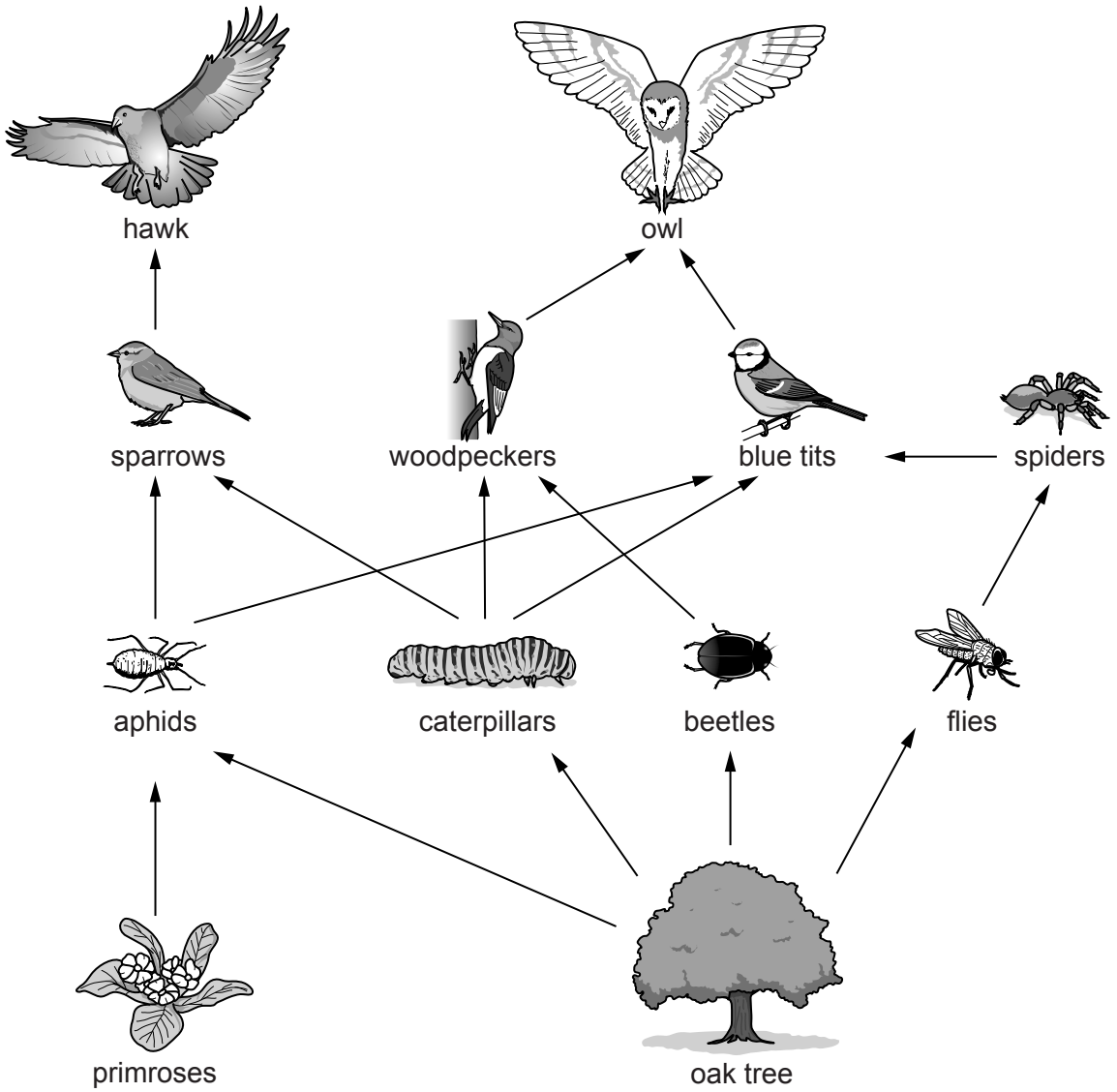
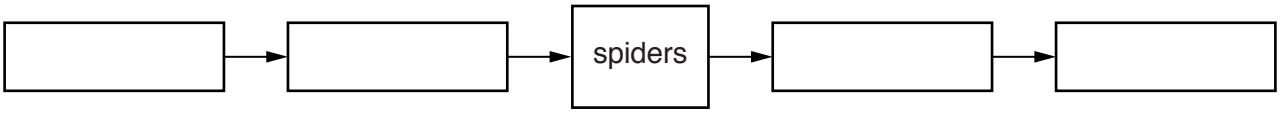


Fig. 8.1 **not drawn to scale**

(a) (i) Name **one** organism in this food web which can trap light energy to produce sugars.

..... [1]

(ii) Complete this food chain from the food web shown in Fig. 8.1. Write the name of one organism in each box.



[2]

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(b) (i) Define the term *population*.

.....

.....

..... [2]

(ii) Define the term *trophic level*, using an example from Fig. 8.1.

.....

.....

..... [2]

(c) Some of the leaves and fruit from the oak tree are not eaten by organisms shown in the food web. The leaves and fruit fall to the ground where they are slowly broken down.

(i) Name **one** kind of organism responsible for this break down.

..... [1]

(ii) Explain how this break down is helpful to the oak trees.

.....

.....

.....

..... [2]

[Total: 10]

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