UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

8888928828829

BIOLOGY **0610/22**

Paper 2 Core **May/June 2013**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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 **21** printed pages and **3** blank pages.

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For Examiner's Use

1 Scientists found four new animal species living in the sea.

Features of the animals are described in Table 1.1.

Table 1.1

animal	description	group
A	body covered by hard exoskeleton more than five pairs of jointed limbs	
B	soft segmented body no obvious limbs present	
C	body covered in small scales gill slits and gills present	
D	scaly body two pairs of legs	

Identify the group to which each animal belongs.

Write your answers in Table 1.1. [4]

[Total: 4]

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2 (a) (i) State **three** uses of water in the human body.

1 .....

2 .....

3 ..... [3]

(ii) In the human body, the amounts of different substances, such as water, remain within narrow limits.

Name the term used to describe the maintenance of a constant internal environment.

..... [1]

(b) Fig. 2.1 shows the water gains and losses in a human over 24 hours.

daily water gains	
drinks	1500 cm^3
water in food	700 cm^3
water formed within body	200 cm^3
total	2400 cm^3

daily water losses	
exhaled air	400 cm^3
faeces	100 cm^3
sweat	500 cm^3
urine	? cm^3
total	2400 cm^3



Fig. 2.1

(i) Fig. 2.1 shows that water is formed within the body.

Name a reaction in the body that produces water.

..... [1]

(ii) Use Fig. 2.1 to calculate the volume of water the person must lose in their urine over the 24 hours to keep the volume of water in the body constant.

volume of water lost in urine ..... cm^3 [1]

For Examiner's Use

(c) (i) The kidney excretes excess water.

State **three** other processes that occur in the kidney.

1 .....

.....

2 .....

.....

3 .....

..... [3]

(ii) On a very hot day the volume of water lost as sweat may increase.

Suggest how increased sweating could affect the urine a person produces.

.....

.....

.....

..... [2]

[Total: 11]

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Question 3 begins on page 6.

For Examiner's Use

3 Cystic fibrosis is an inherited disorder.

People with this disorder produce mucus that is very thick and sticky.

This mucus can block many passages in the body including the bronchi and bronchioles.

(a) Suggest why people with cystic fibrosis often have lung infections.

.....

.....

.....

.....

.....

..... [3]

(b) Cystic fibrosis is controlled by a recessive allele.

What is meant by the term *recessive allele*?

.....

..... [1]

(c) Use **F** to represent the allele for normal mucus and **f** to represent the allele for very thick mucus, that causes cystic fibrosis.

(i) State the genotypes of a person with cystic fibrosis.

..... [1]

(ii) Two parents with normal mucus have a child with cystic fibrosis.

State the genotype of the parents.

..... [1]

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(iii) These parents have another child.

Complete the genetic diagram to show the possibility that this child will also have cystic fibrosis.

parental phenotypes	normal mucus	×	normal mucus
parental genotypes	.....	×	.....
gametes	....	+	....

offspring genotypes ....

offspring phenotypes ....

possibility of a child having cystic fibrosis .....

[4]

[Total: 10]

For Examiner's Use

4 Explain the meaning of each of the terms and give one example of each.

(a) non-renewable material

.....

.....

.....

.....

.....

example ..... [3]

(b) sewage

.....

.....

example ..... [2]

[Total: 5]

For Examiner's Use

5 Fig. 5.1 shows a section through the human female reproductive system and other structures.

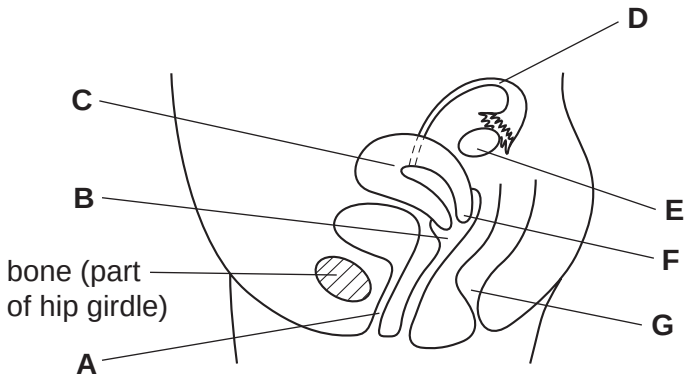


Fig. 5.1

In Table 5.1, write the letter from Fig. 5.1 which labels the structure that carries out each function.

One has been completed for you.

Table 5.1

function	letter
produces egg cells	**E**
where sperm are deposited during intercourse	
ring of muscle that relaxes to allow the baby to be born	
where implantation takes place	
where fertilisation takes place	

[4]

[Total: 4]

For Examiner's Use

6 (a) (i) Fig. 6.1 shows the outline of the young stem of a eudicotyledonous (dicotyledonous) plant.

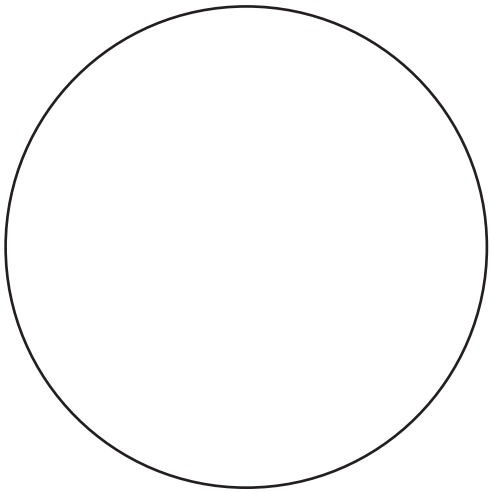


Fig. 6.1

On Fig. 6.1, draw and label the position of the phloem and xylem in the stem. [2]

(ii) Name a substance that is transported in the phloem.

.....

..... [1]

(b) Describe the pathway taken by water from the soil to a leaf.

.....

.....

.....

.....

.....

..... [3]

[Total: 6]

For Examiner's Use

7 (a) (i) Fig. 7.1 shows a simple reflex arc.

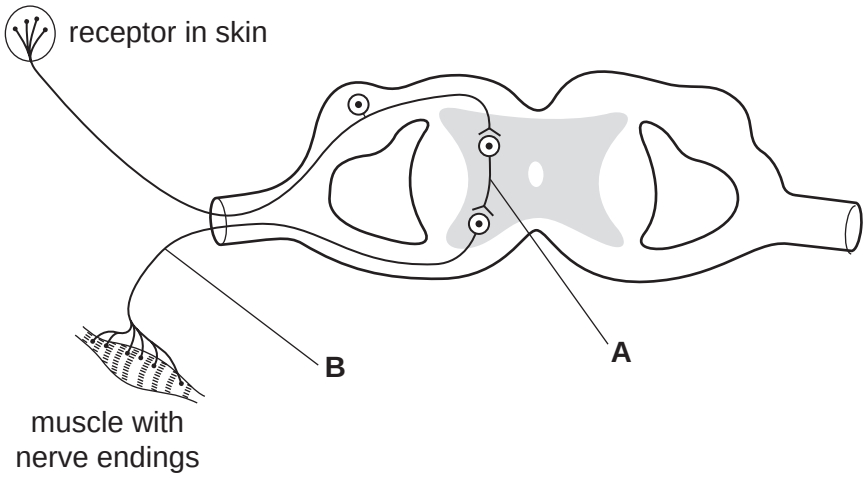


Fig. 7.1

Name the cells labelled **A** and **B** as shown on Fig. 7.1.

A .....

B ..... [2]

(ii) State **two** features of a reflex action.

1 .....

.....

2 .....

..... [2]

(b) State what is meant by an *effector*.

.....

..... [1]

For Examiner's Use

(c) Fig. 7.2 shows the muscles and bones around the elbow joint.

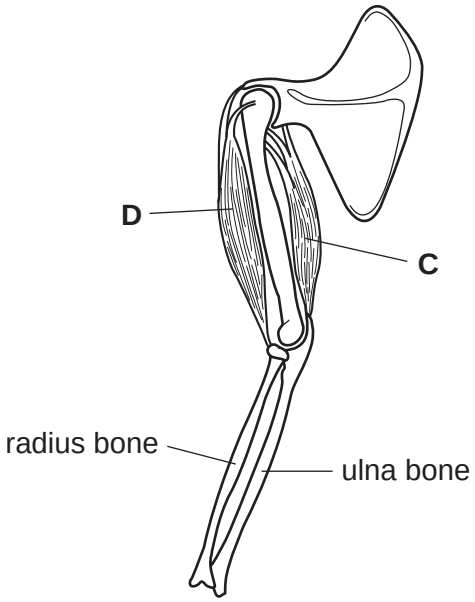


Fig. 7.2

(i) Name the structures labelled **C** and **D** as shown on Fig. 7.2.

C .....

D ..... [2]

(ii) A nerve impulse stimulates muscle **D** to contract.

Describe what will happen to the muscles and bones of the arm.

.....

.....

.....

..... [2]

[Total: 9]

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Question 8 begins on page 14.

For Examiner's Use

8 The metabolism of an organism involves many processes that need energy.

(a) Complete the word equation for aerobic respiration.

glucose + oxygen ⟶ ..... + ... + energy

[2]

(b) The rate of metabolism can be calculated and it is called the metabolic rate.

Fig. 8.1 shows changes in pulse rate as metabolic rate increases during exercise.

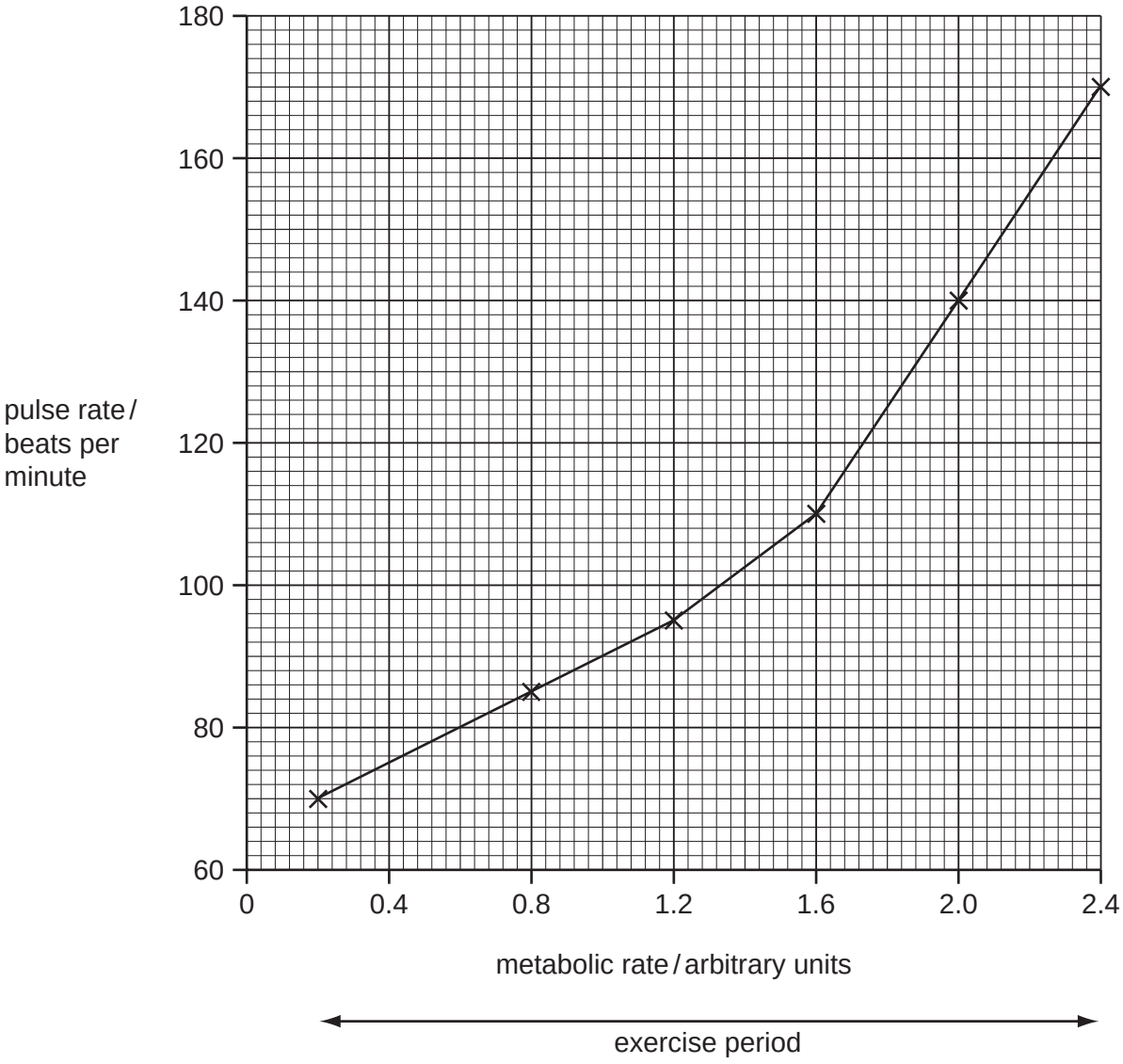


Fig. 8.1

Fig. 8.2 shows changes in the output of blood from the heart (stroke volume) as metabolic rate increases during exercise.

For Examiner's Use

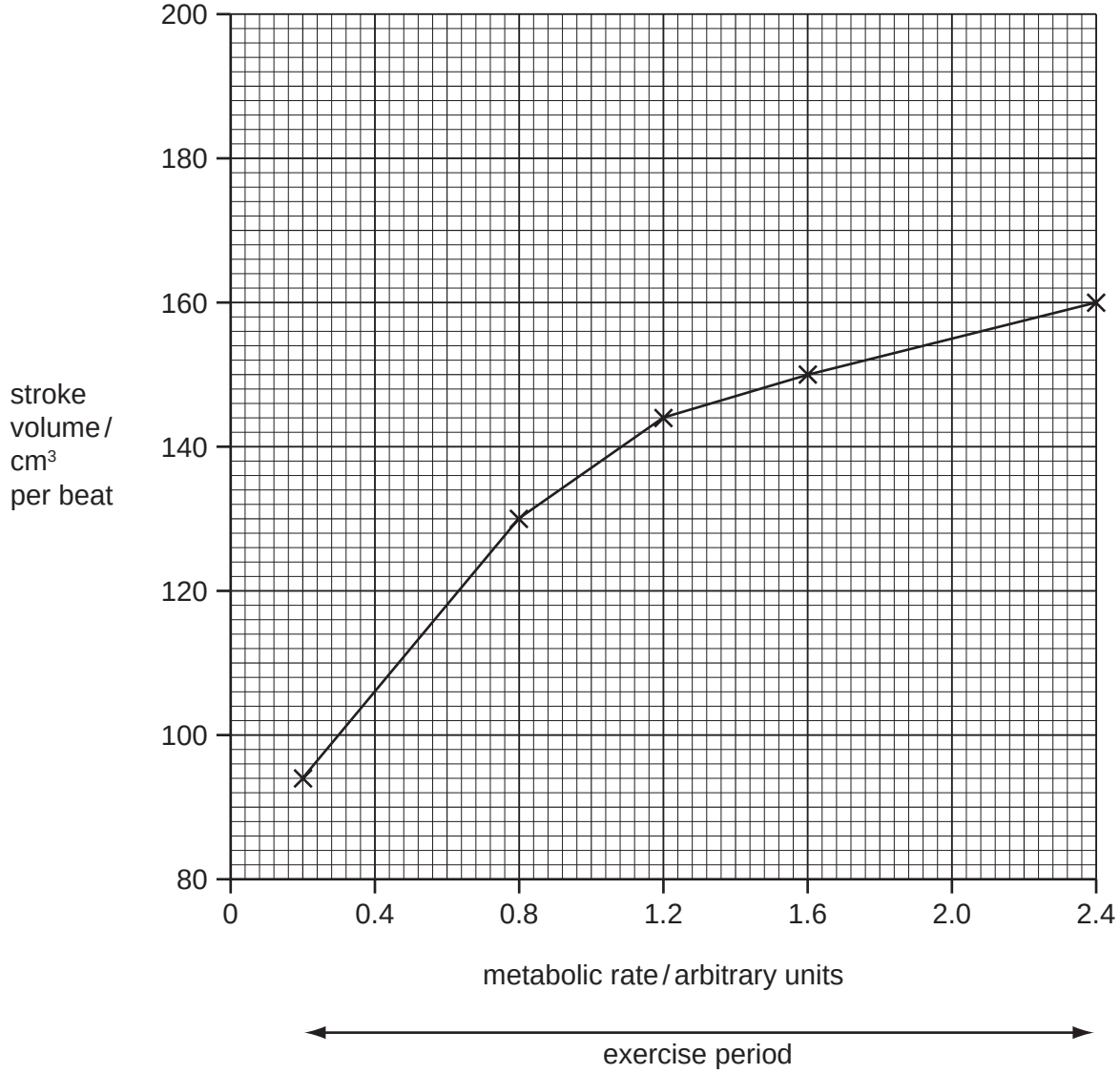


Fig. 8.2

(i) Use Fig. 8.1 to state the metabolic rate before exercise started.

.....arbitrary units [1]

(ii) Use Fig. 8.1 and Fig. 8.2 to state what the stroke volume was when the pulse rate had increased to 110 beats per minute.

.....cm^3 per beat [1]

For Examiner's Use

(c) (i) Explain why pulse rate increased during exercise.

.....

.....

.....

.....

.....

..... [3]

(ii) Suggest what happens to the pulse rate when exercise is finished.

.....

.....

.....

..... [2]

(d) Suggest **one** way in which the output of the heart (stroke volume) can be increased.

.....

..... [1]

[Total: 10]

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9 Fig. 9.1 shows a potato plant.

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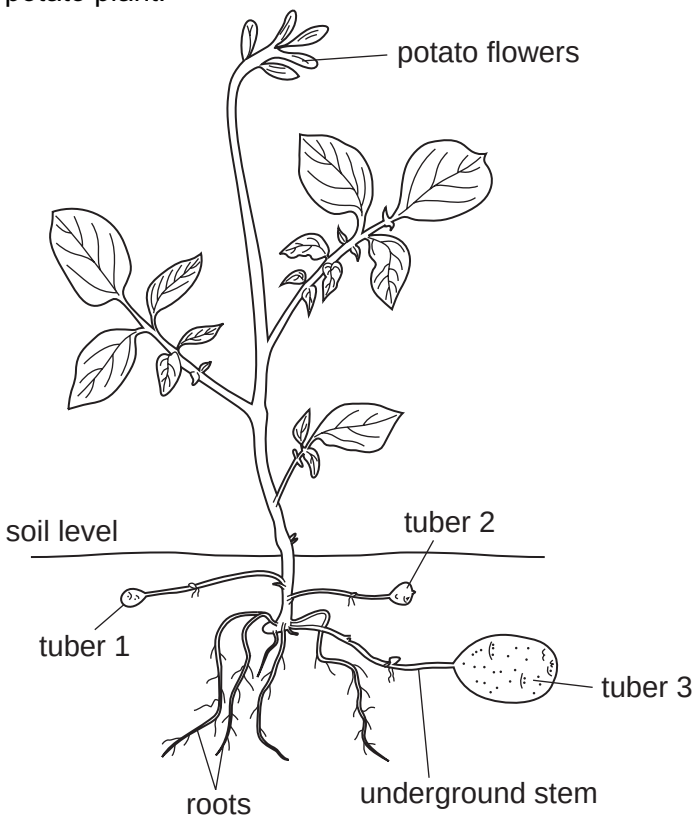


Fig. 9.1

As the plant grows, buds on the underground stem grow into side shoots.
The ends of these shoots swell to form tubers.
The tubers can grow into new plants.

(a) (i) Which type of nuclear division will occur at the end of a shoot as a tuber develops?

.....

[1]

(ii) The three tubers, shown in Fig. 9.1, are each grown to form separate plants.
They all show the same characteristics as the parent plant.

Explain why this happens.

.....

.....

[1]

For Examiner's Use

(iii) After two months the three new plants were different sizes.

Suggest **two** reasons why the plants were different.

1 .....

.....

2 .....

..... [2]

(b) The potato plant has purple flowers that are usually insect-pollinated. After pollination the seeds formed can grow into new plants.

(i) Explain why these plants may show features different from the parent plants.

.....

.....

.....

.....

.....

..... [3]

(ii) A scientist has two varieties of potato.

One variety has disease resistance and the other variety grows well in dry soil.

Suggest how the scientist could produce a new variety with both of these characteristics.

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

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Question 10 begins on page 20.

For Examiner's Use

10 (a) Define the term *ecosystem*.

.....

.....

.....

..... [2]

(b) Fig. 10.1 shows the food web of a heather moor ecosystem in Scotland.

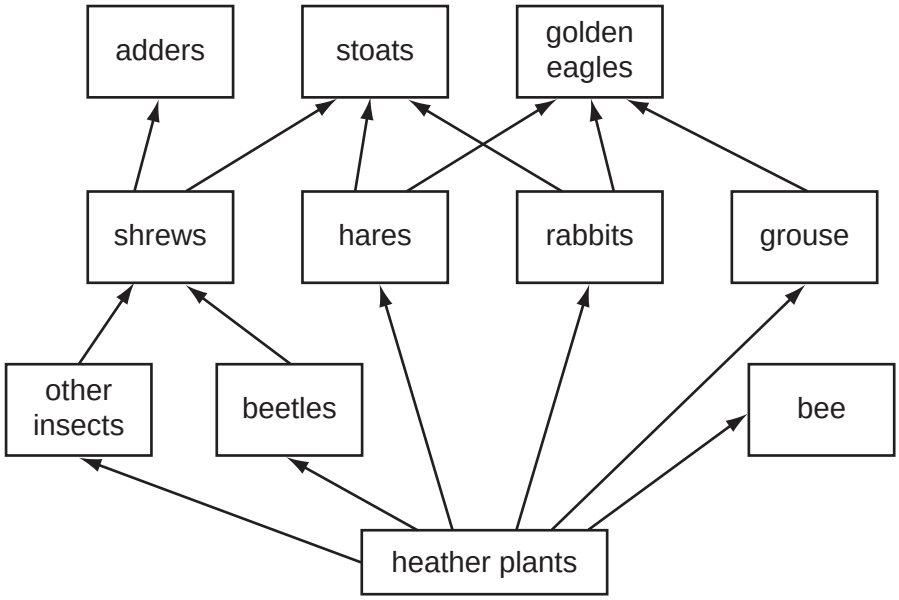


Fig. 10.1

(i) State the source of energy for all the organisms in this food web.

..... [1]

(ii) Name the producer in this food web.

..... [1]

(c) Use the boxes to form a food chain with four organisms shown in Fig. 10.1.

Use arrows to show the flow of energy through the food chain.

[3]

For Examiner's Use

(d) In one year, a large number of young grouse died before they matured.

Suggest how this would affect the numbers of hares and shrews in this food web.

(i) hares .....

.....

.....

..... [2]

(ii) shrews .....

.....

.....

..... [2]

[Total: 11]

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