Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

6508111556

BIOLOGY **0610/21**

Paper 2 Core **May/June 2014**

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, 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 five different mammals.
They are not drawn to the same scale.

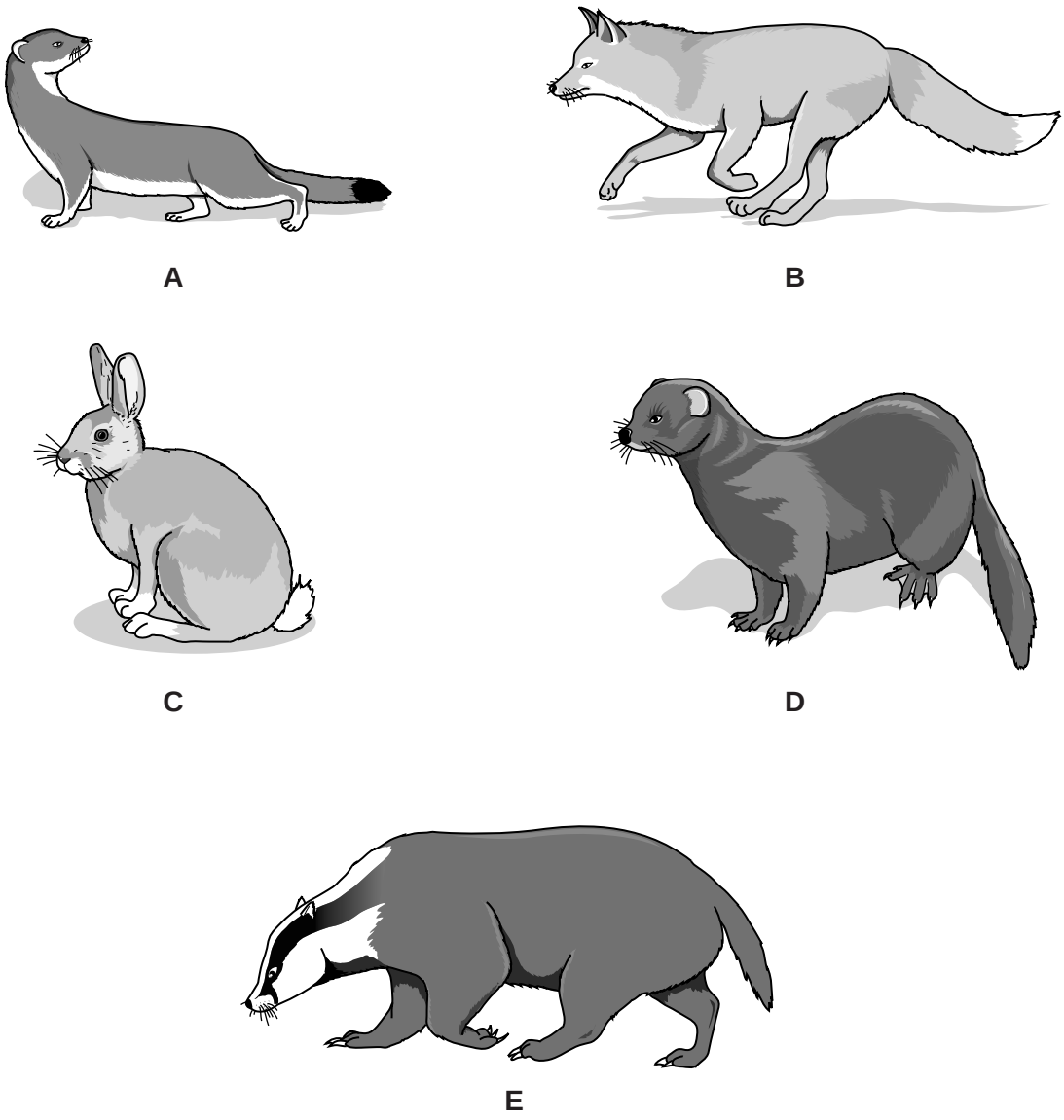


Fig. 1.1

Use the key to identify the mammals shown in Fig. 1.1.

Complete Table 1.1 by writing the names of the five mammals.

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Key

		name of mammal
1	(a) has ears more than half the length of the head	*O. cuniculus*
	(b) has ears less than half the length of the head	go to 2
2	(a) has fur on tail all one colour	go to 3
	(b) has fur on tip of tail a different colour to rest of tail fur	go to 4
3	(a) has webbed feet (skin between the toes)	*M. vison*
	(b) does not have webbed feet (no skin between the toes)	*M. leucurus*
4	(a) has white fur on the end of the tail	*V. vulpes*
	(b) has black fur on the end of the tail	*M. erminea*

Table 1.1

mammal	name of mammal
A	
B	
C	
D	
E	

[4]

[Total: 4]

2 Fig. 2.1 shows the average body mass and the average heart rate of nine mammals.

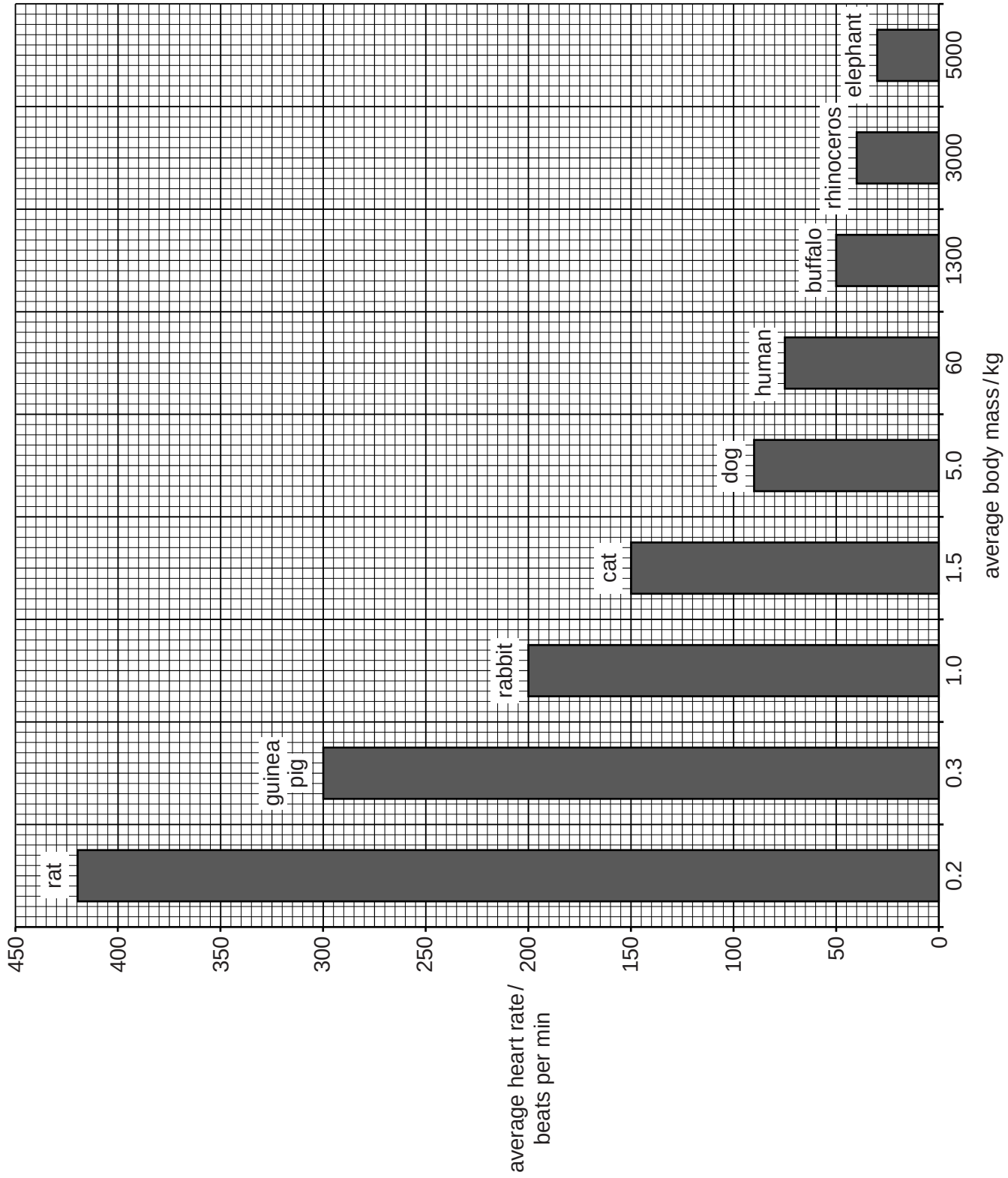


Fig. 2.1

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(a) (i) Name the mammal that has an average body mass of 1300 kg.

..... [1]

(ii) State the average heart rate of a guinea pig.

..... beats per minute [1]

(iii) Name the mammal that has an average heart rate of 30 beats per minute.

..... [1]

(iv) Calculate how many times faster the heart of a rabbit beats than that of a buffalo.

Show your working.

..... [2]

(b) Describe the relationship between average body mass and average heart rate, shown in Fig. 2.1.

.....

.....[1]

(c) When the heart beats, it pumps blood round the body.
Fig. 2.2 shows the components of blood as seen through a light microscope.

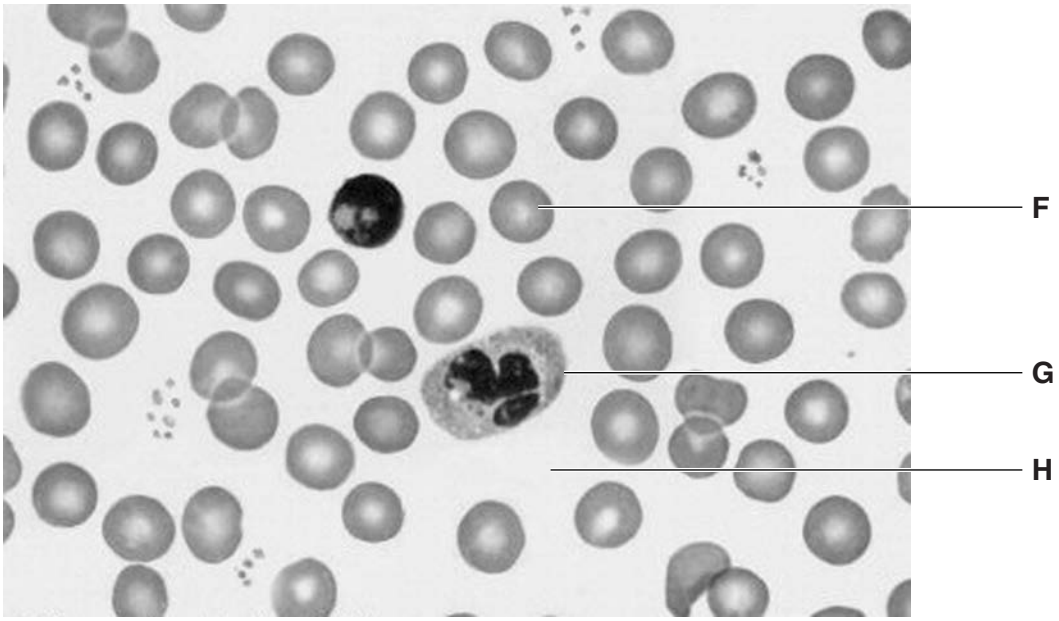


Fig. 2.2

Y: \ASD\Sciences\Biology\biologyimages\blood\humblood×1000

Name the blood components labelled **F**, **G** and **H** in Fig. 2.2.

State **one** function for each component.

Write your answers in Table 2.1.

Table 2.1

label	name of blood component	one function of the blood component
F		
G		
H		

[6]

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(d) Fig. 2.3 shows a diagram representing part of the human circulatory system. The arrows indicate the direction of blood flow.

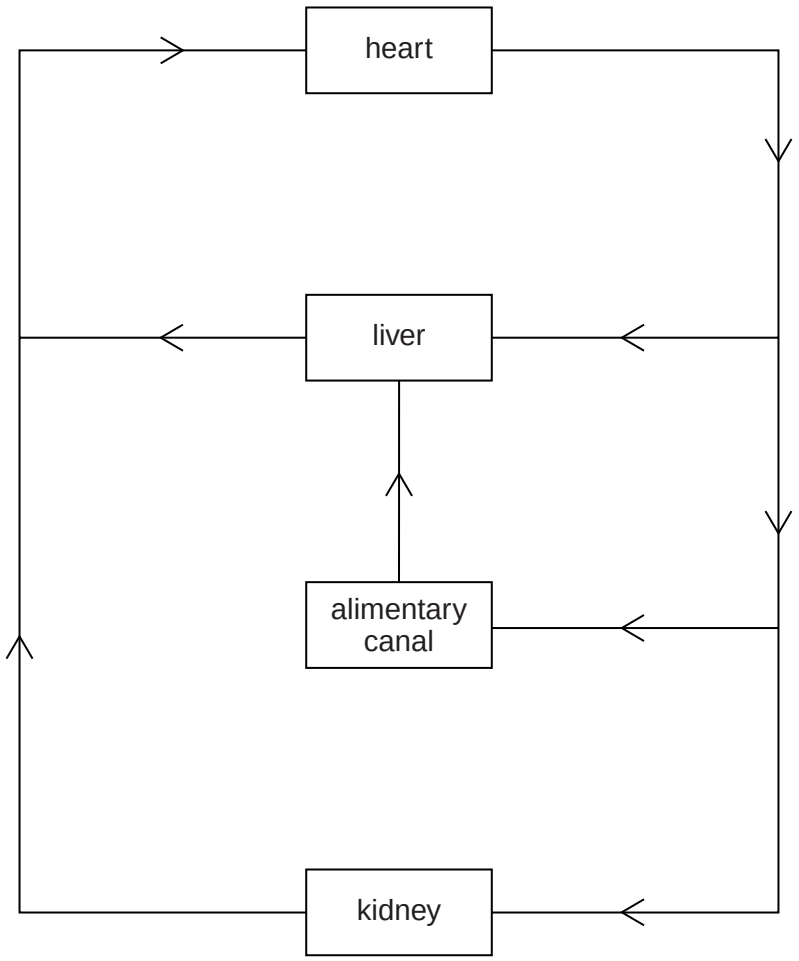


Fig. 2.3

On Fig. 2.3, label the lines that represent:

- the aorta;
- the hepatic portal vein.

[2]

(e) Some students carried out an investigation into the effect of exercise on heart rate. Their results are shown in Table 2.2.

Table 2.2

average heart rate at rest / beats per min	average heart rate after exercise / beats per min
75	130

Explain why exercise caused the average heart rate to increase.

.....

.....

.....

.....

.....

..... [3]

[Total: 17]

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3 **(a)** Table 3.1 contains six statements about different methods of birth control.
Only **three** of the statements are correct.

Read each statement carefully and decide if it is correct.
Place a tick (✓) in the box next to each correct statement.

Table 3.1

statement about method of birth control	correct?
A chemical in spermicidal cream kills the sperm.	
In a vasectomy only one of the sperm ducts of a man needs to be cut so that sperm cannot pass along it.	
The condom and femidom both work by catching the sperm in a thin rubber bag.	
The diaphragm is effective in birth control as it prevents the penis entering the vagina.	
The female contraceptive pill prevents an egg cell being released.	
The IUD is a device that stops sperm swimming through the cervix.	

[3]

(b) State which method of birth control is effective at preventing the spread of the human immunodeficiency virus (HIV).

Explain why it is effective.

Method .....

Explanation .....

.....

.....

.....
[3]

(c) The *rhythm method* is another type of birth control.
It is less reliable than other methods.

(i) Outline how the rhythm method works.

.....

.....

.....

..... [2]

(ii) Suggest a reason why the rhythm method is used, even though it is not very reliable.

.....

..... [1]

[Total: 9]

4 Fig. 4.1 shows part of the carbon cycle.

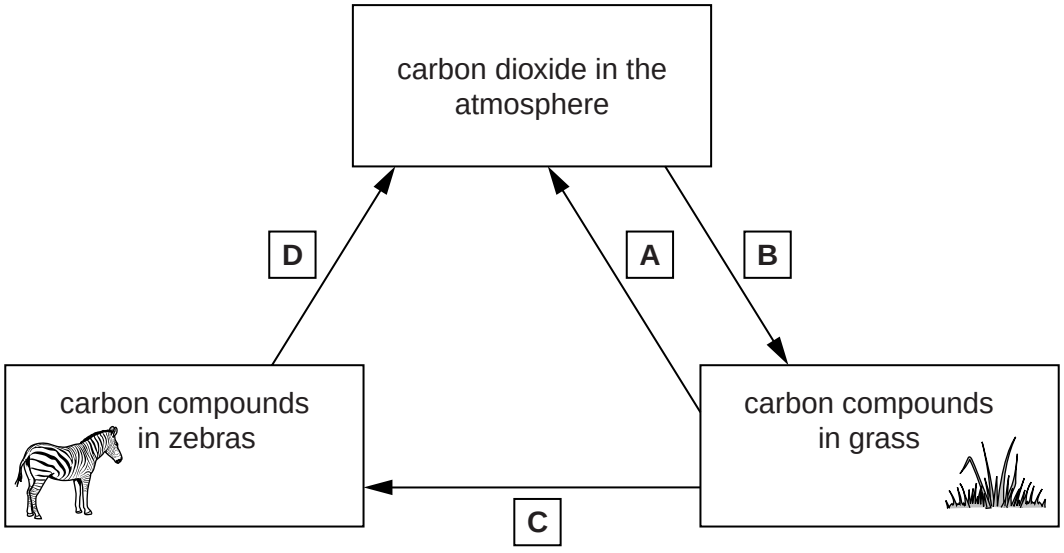


Fig. 4.1

(a) Name the processes labelled **A**, **B**, **C** and **D** in Fig. 4.1.
Write your answers in Table 4.1.

Table 4.1

	name of process
A	
B	
C	
D	

[4]

(b) Name a compound containing carbon:

(i) that is found in grass,

.....[1]

(ii) that is found in zebras.

..... [1]

(c) When a zebra dies, the carbon in its body is eventually returned to the atmosphere in the form of carbon dioxide.

Explain how this happens.

.....

.....

.....

.....

.....

.....

..... [3]

(d) State **two** human activities that are increasing the amount of carbon dioxide in the atmosphere.

1 .....

2 .....

[2]

[Total: 11]

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[Turn over

5 **(a)** Fig. 5.1 shows a section through a leaf.

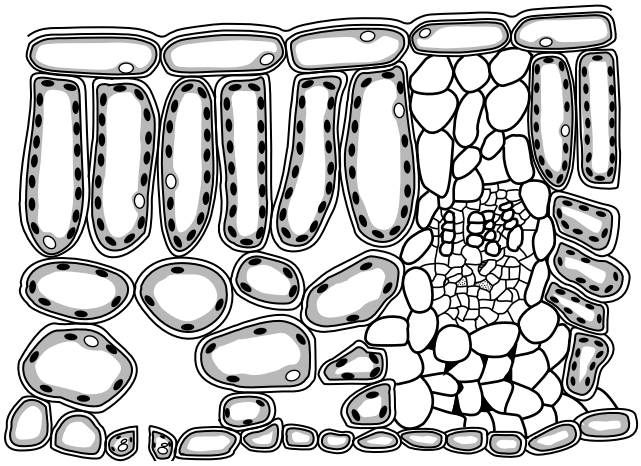


Fig. 5.1

Fig. 5.2 names some structures found in a leaf and states a function of each of these structures.

On Fig. 5.2, draw **one** straight line between **each** structure and the function it carries out.

structure	**function**
cuticle	allows gaseous exchange with surroundings
stoma	allows diffusion of gases within the leaf
palisade cell	waterproofs the leaf
phloem tissue	transports sucrose out of the leaf
spongy mesophyll	produces glucose

[4]

Fig. 5.2

(b) Xylem vessels transport water into the leaf.

State **two** other functions of xylem vessels.

1 .....

2 .....
[2]

(c) Some of the glucose made in the leaf is changed into another compound and stored by the plant.

Name this compound.

..... [1]

(d) Some of the structures in the leaf are involved in transpiration.

Define *transpiration*.

.....

.....

.....

.....

.....

..... [2]

[Total: 9]

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[Turn over

6 Fig. 6.1 shows a diagram of the alimentary canal.

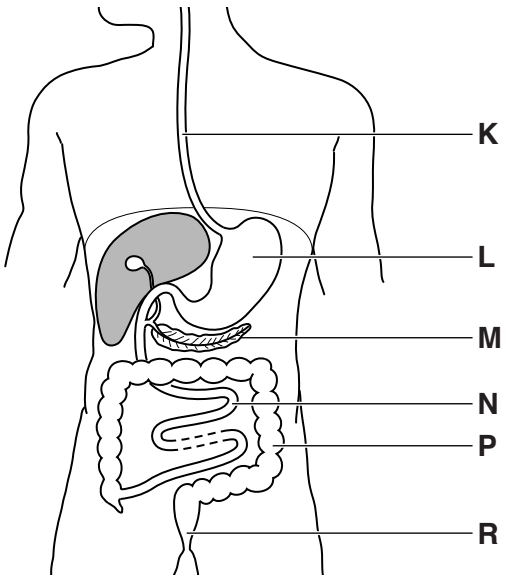


Fig. 6.1

(a) Use the letters on Fig. 6.1 to identify:

the colon, ...

the pancreas, ...

the stomach. .....

[3]

(b) State **one** function for each of these parts of the alimentary canal.

colon .....

.....

pancreas .....

.....

stomach .....

.....

[3]

(c) **(i)** On Fig. 6.1 draw a line to show where bile is made.
Label it **X**.

[1]

(ii) State the action that bile has on fats in the small intestine.

.....

..... [1]

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(iii) Explain how this action speeds up the digestion of fats.

.....

.....

.....

..... [2]

(d) Digested food is absorbed as it passes along the small intestine.

Explain how this absorption takes place.

.....

.....

.....

.....

.....

..... [3]

[Total: 13]

7 Fig. 7.1 shows a food web.

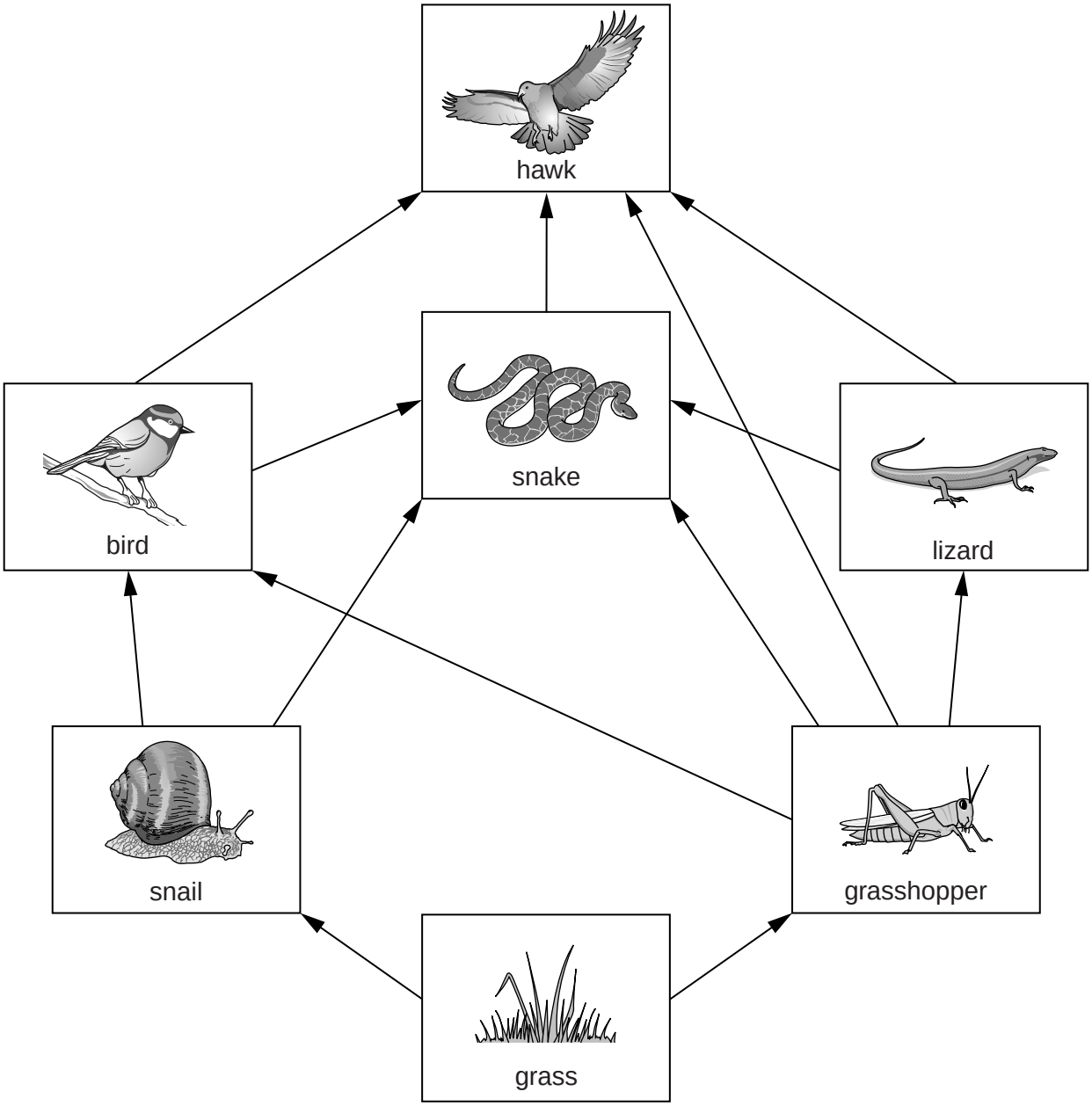


Fig. 7.1

(a) State what the arrows on Fig. 7.1 represent.

.....

..... [1]

(b) Use the information in Fig. 7.1 to give:

the name of a producer, ...

the name of a secondary consumer, ...

the number of herbivore species present, ...

the number of carnivore species present. .....

[4]

(c) Name an organism in this food web that occupies two trophic levels.

..... [1]

[Total: 6]

8 **(a)** **(i)** Name the type of cell division that forms gametes (sperm cells and egg cells).

..... [1]

(ii) State the difference between the number of chromosomes in gametes and the number of chromosomes in other body cells.

.....

..... [1]

(b) The sex of a human is determined by the sex chromosomes, X and Y.

State which sex chromosomes are present in a male and in a female.

male .....

female .....

[2]

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[Turn over

(c) (i) Define the term *allele*.

.....

..... [1]

(ii) The fur colour in a species of mouse can be black or white.
The allele for black fur is dominant to the allele for white fur.

Fig. 8.1 shows the cross between a mouse that is homozygous for black fur and a mouse that is homozygous for white fur.

parental phenotype:	black fur	×	white fur
		×	
parental genotype:	BB	×	bb

Fig. 8.1

All the offspring are black and have the genotype Bb.

Two of these offspring were mated together.

Complete Fig. 8.2 to show the results of this cross.

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parental phenotype:	black fur 	×		×	black fur 		
parental genotype:	.....	×			.....		
gametes:	○	+	○	×	○	+	○
offspring genotype:	.....		.....		.....		.....
offspring phenotype:	.....		.....		.....		.....
ratio:	..... black	:			..... white		

[5]

Fig. 8.2

(d) In an investigation, a mouse with black fur and a mouse with white fur were mated several times. A total of 40 offspring were produced.

There were 19 offspring with black fur and 21 with white fur.

Deduce the genotype of the parent that had black fur.

genotype ..... [1]

[Total: 11]

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