

CANDIDATE
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BIOLOGY (US)

0438/31

Paper 3 Extended

October/November 2015

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Center 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.

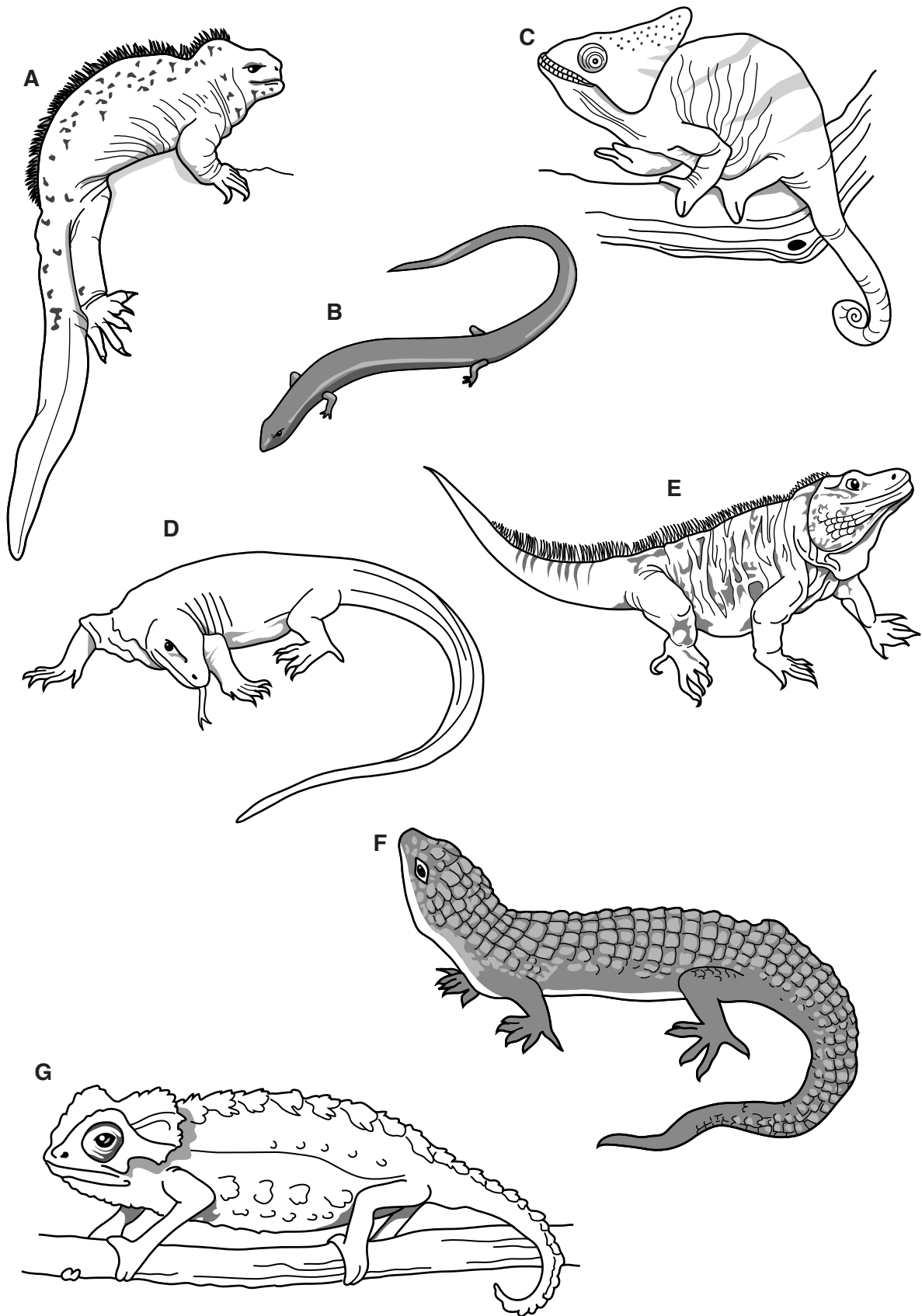
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

This document consists of **16** printed pages.

1 Fig. 1.1 shows seven lizards that are at risk of becoming extinct.



not to same scale

Fig. 1.1

(c) Zookeepers report that isolated female Komodo dragons, *Varanus komodoensis*, have produced offspring asexually. This is very unusual in vertebrates.

(i) State **two** disadvantages of asexual reproduction.

.....
.....
.....
.....
.....[2]

(ii) State **two** disadvantages of sexual reproduction.

.....
.....
.....
.....
.....[2]

(d) Sexual reproduction requires meiosis to occur.

(i) Define the term *meiosis*.

.....
.....
.....[2]

(ii) Explain the significance of meiosis to the survival of endangered species of lizards.

.....
.....
.....
.....
.....[3]

[Total: 16]

- 2 The pressure in the lungs of a student before and during the start of a volleyball match was recorded.

The results are shown in Fig. 2.1.

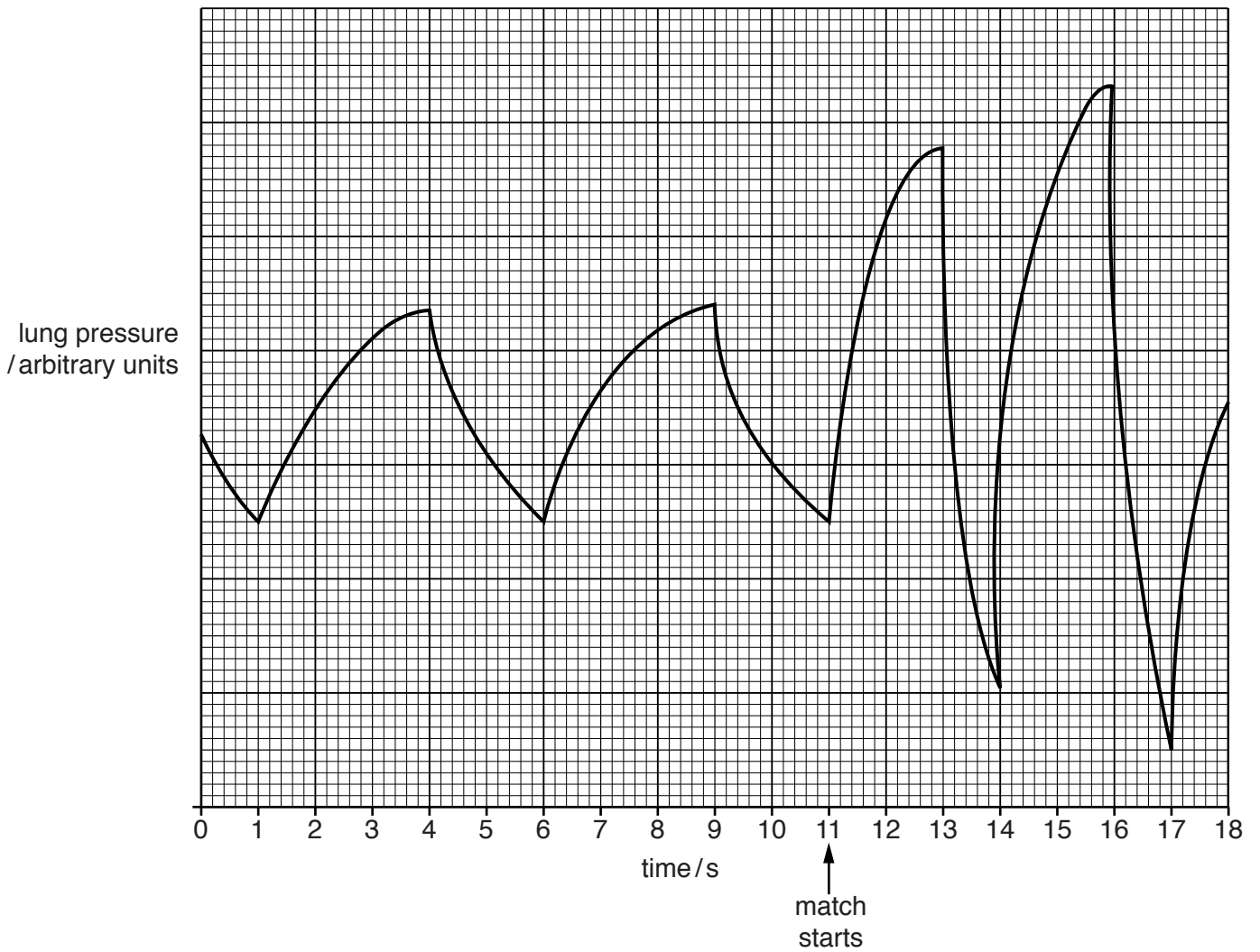


Fig. 2.1

- (a) (i) Use the results in Fig. 2.1 to calculate the breathing rate before the start of the match. Express your answer to the nearest whole number.

Show your working.

.....breaths per minute
[2]

(d) Carbon dioxide moves from the blood capillaries into the alveoli by diffusion.

Explain why the rate of diffusion of carbon dioxide increases during exercise.

.....

.....

.....

.....

.....

.....[2]

[Total: 14]

3 Fig. 3.1 is a diagram of human skin in cold weather.

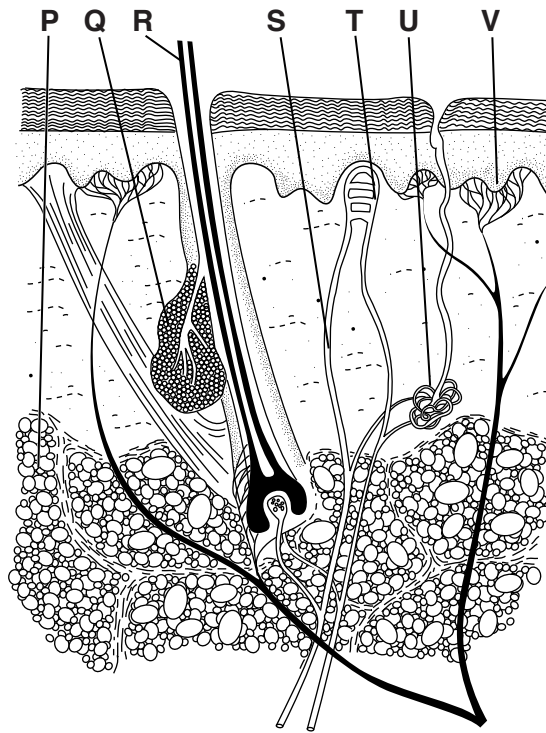


Fig. 3.1

(a) Table 3.1 shows the responses of the skin to cold weather.

Complete the table by:

- naming the parts of the skin that respond to cold weather
- using the letters (**P** to **V**) from Fig. 3.1 to identify these parts of the skin.

Table 3.1

responses of skin to cold weather	name of part	letter from Fig. 3.1
stands upright to trap air		
constricts to reduce blood flow to skin		
stops producing sweat		

[3]

4 Leaves are made of tissues.

(a) Define the term *tissue*.

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

Fig. 4.1 is a photograph of a transverse section of a leaf, showing the upper and lower surfaces.

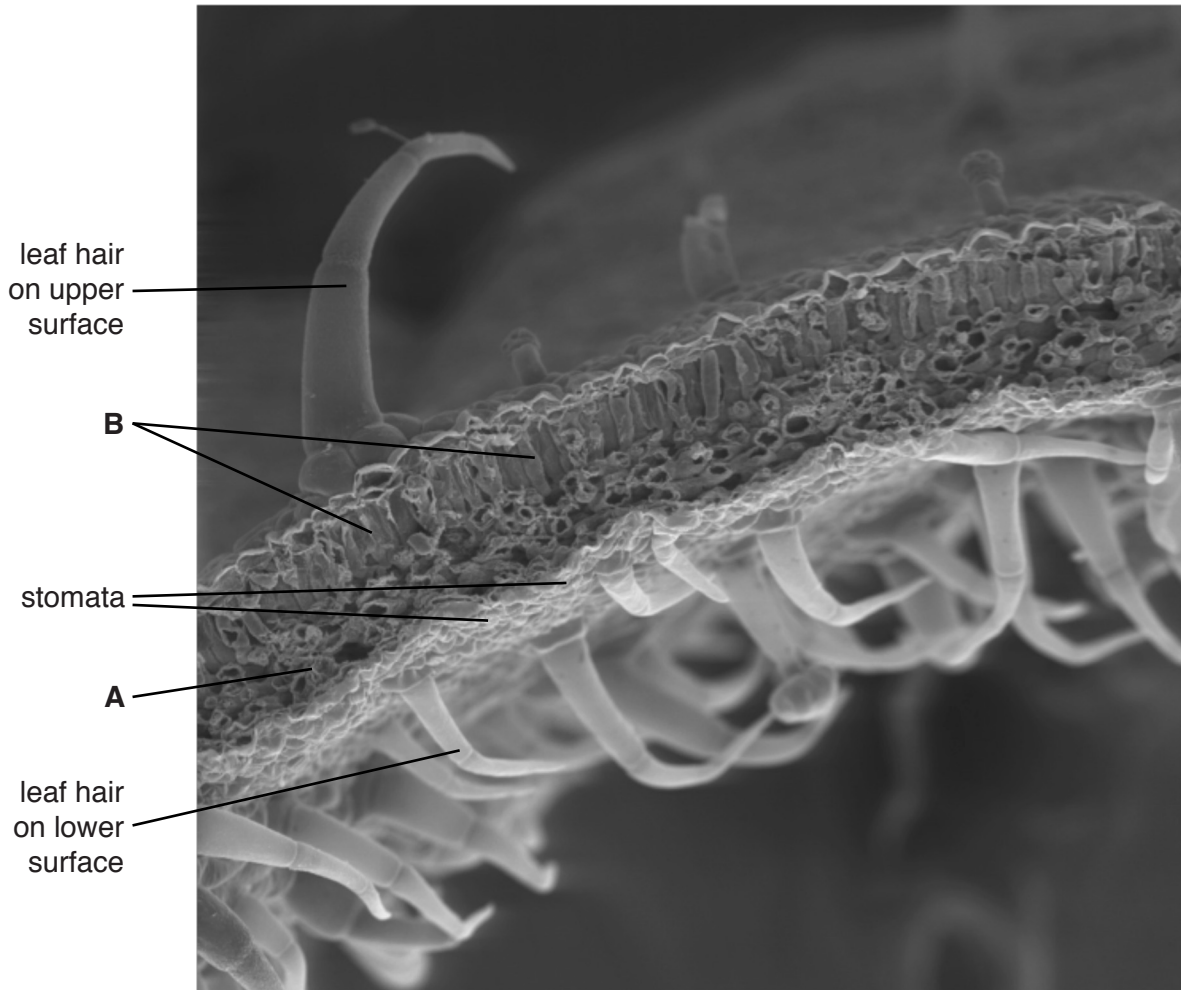


Fig. 4.1

(b) Name:

(i) tissue **A**

.....[1]

(ii) the process by which gases travel through the stomata.

.....[1]

(c) Describe how root hair cells differ from the cells labeled **B** in Fig. 4.1.

.....
.....
.....
.....
.....[2]

(d) Outline how water that has entered a root hair cell reaches the stomata.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....[4]

(e) Leaf hairs, shown in Fig. 4.1, help to increase the humidity near the leaf surface.

(i) Compare the leaf hairs on the upper leaf surface with the leaf hairs on the lower leaf surface.

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

(ii) Explain the importance of increasing humidity near the leaf surface.

.....
.....
.....
.....
.....[2]

[Total: 12]
[Turn over]

- 5 Fig. 5.1 is a diagram showing the events from pollination to fertilization in a species of flowering plant.

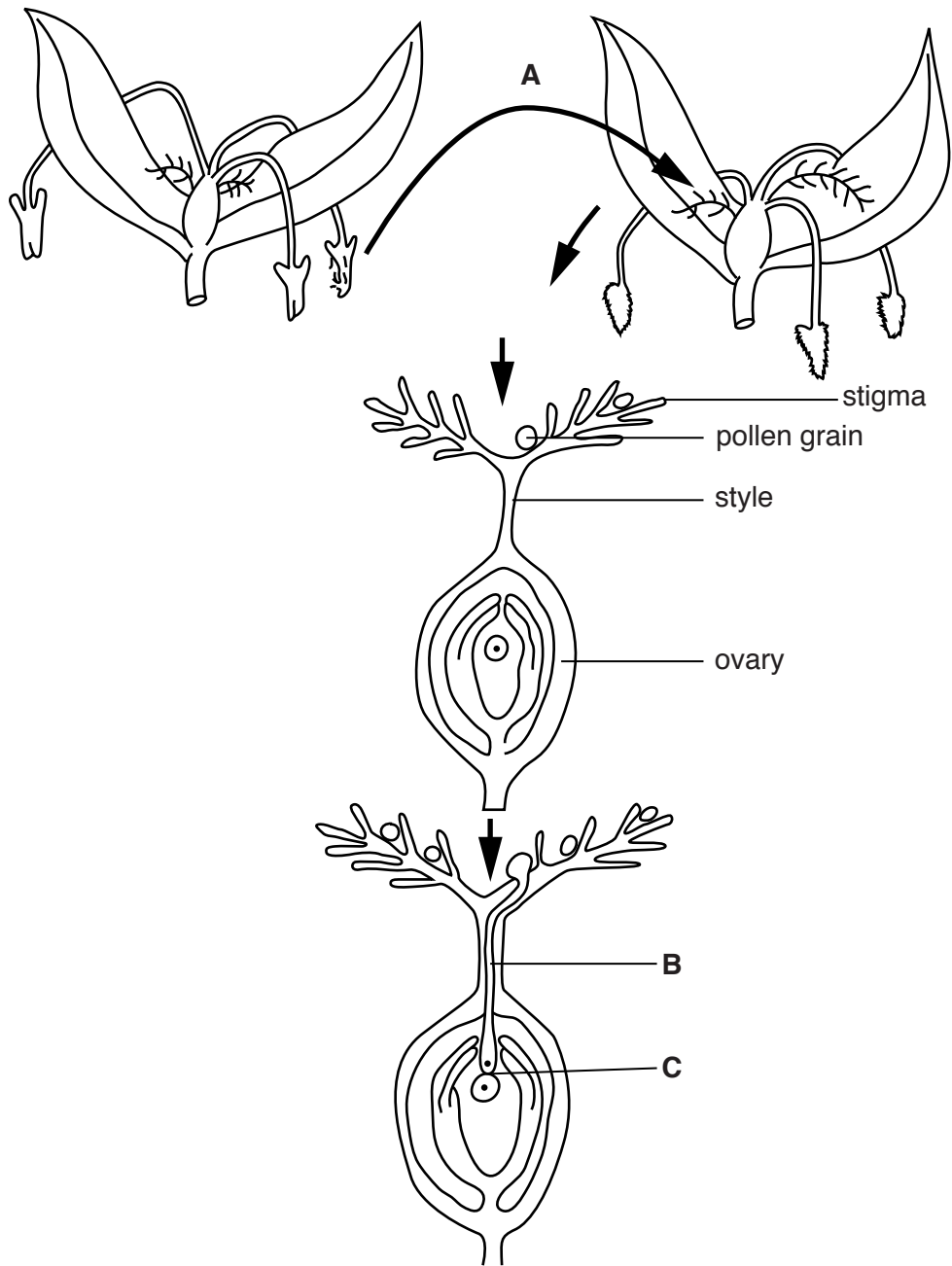


Fig. 5.1

- (a) Name the likely method of pollination for the flowers shown at A in Fig. 5.1. Give an explanation for your choice.

method of pollination

explanation

.....

[3]

(b) In Fig. 5.1 pollen is transferred from one plant to another.

State the name for this type of pollination.

.....[1]

(c) Name structure **B** shown in Fig. 5.1 and state its function.

.....
.....
.....[2]

(d) Fertilization occurs at **C** as shown in Fig. 5.1.

Describe what happens at fertilization in flowering plants.

.....
.....
.....
.....
.....[2]

(e) Seed formation occurs after fertilization. Seeds are formed inside the fruits and then dispersed.

(i) Name the part of the flower that develops into the seed.

.....[1]

(ii) Name the part of the flower that develops into the fruit.

.....[1]

(iii) State an advantage of seed dispersal.

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

(f) Seed germination occurs when conditions are suitable.

Explain the role of enzymes in seed germination.

.....

.....

.....

.....

.....

.....[2]

[Total: 13]

- 6 The government in Denmark encourages people to recycle their household waste. Table 6.1 shows the mass of household waste collected for recycling in Denmark in 2000, 2004 and 2008.

Table 6.1

type of waste collected from households	mass of household waste collected for recycling / thousand tons		
	2000	2004	2008
paper and paper packaging	181	221	207
glass	83	88	65
plastic	2	4	4
metal	17	25	410
green kitchen waste	45	53	38
garden waste	505	495	527

- (a) Many governments aim to recycle at least 50% of all household waste. In 2008, 2558 thousand tons of household waste was produced in Denmark.

- (i) Calculate the percentage of household waste that was recycled in 2008. Give your answer to the nearest whole number.

Show your working.

..... %
[2]

- (ii) The mass of waste paper and paper packaging collected for recycling decreased slightly between 2004 and 2008.

Suggest a reason for this slight decrease.

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

- (iii) Name **one** other type of recyclable waste, shown in Table 6.1, which shows a similar trend to paper and paper packaging.

.....[1]

