Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

BIOLOGY **0610/31**

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 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 **16** printed pages.

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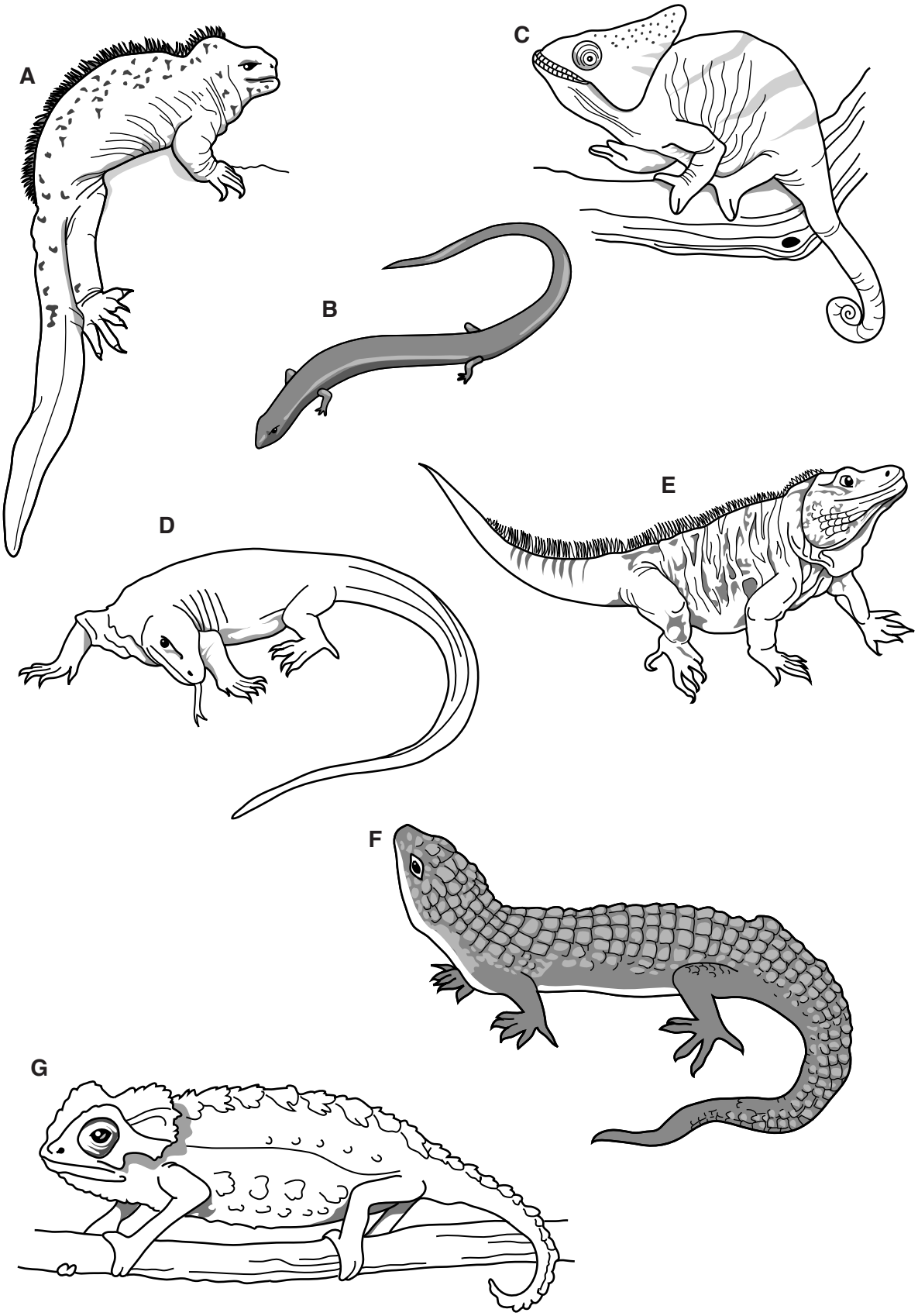
1 Fig. 1.1 shows seven lizards that are at risk of becoming extinct.



not to same scale

Fig. 1.1

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(a) (i) Name the vertebrate group that contains lizards.

.....[1]

(ii) Use the key to identify each species. Write the letter of each species (**A** to **G**) in the correct box beside the key. One has been done for you.

View solution

key

1	(a)	feet with three toes	go to 2	
	(b)	feet with five toes	go to 3	
2	(a)	has a collar or crest on head	go to 4	
	(b)	has no collar or crest on head	*Chalcides minutus*	
3	(a)	spikes along back	go to 5	
	(b)	no spikes along back	go to 6	
4	(a)	ridges extend along back and tail	*Brookesia perarmata*	
	(b)	no ridges along back or tail	*Calumma parsonii*	
5	(a)	blunt, rounded head	*Amblyrhynchus cristatus*	
	(b)	elongated head	*Cyclura lewisi*	
6	(a)	large raised scales on skin	*Abronia graminea*	
	(b)	scales on skin are not large or raised	*Varanus komodoensis*	**D**

[3]

(b) The effect of humans on the environment has caused the populations of the lizard species in Fig. 1.1 to decrease.

View solution

Explain why conserving lizards is important.

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.....[3]

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

View solution

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

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.....[2]

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

View solution

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.....[2]

(d) Sexual reproduction requires meiosis to occur.

View solution

(i) Define the term *meiosis*.

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.....[2]

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

View solution

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.....[3]

[Total: 16]

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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.

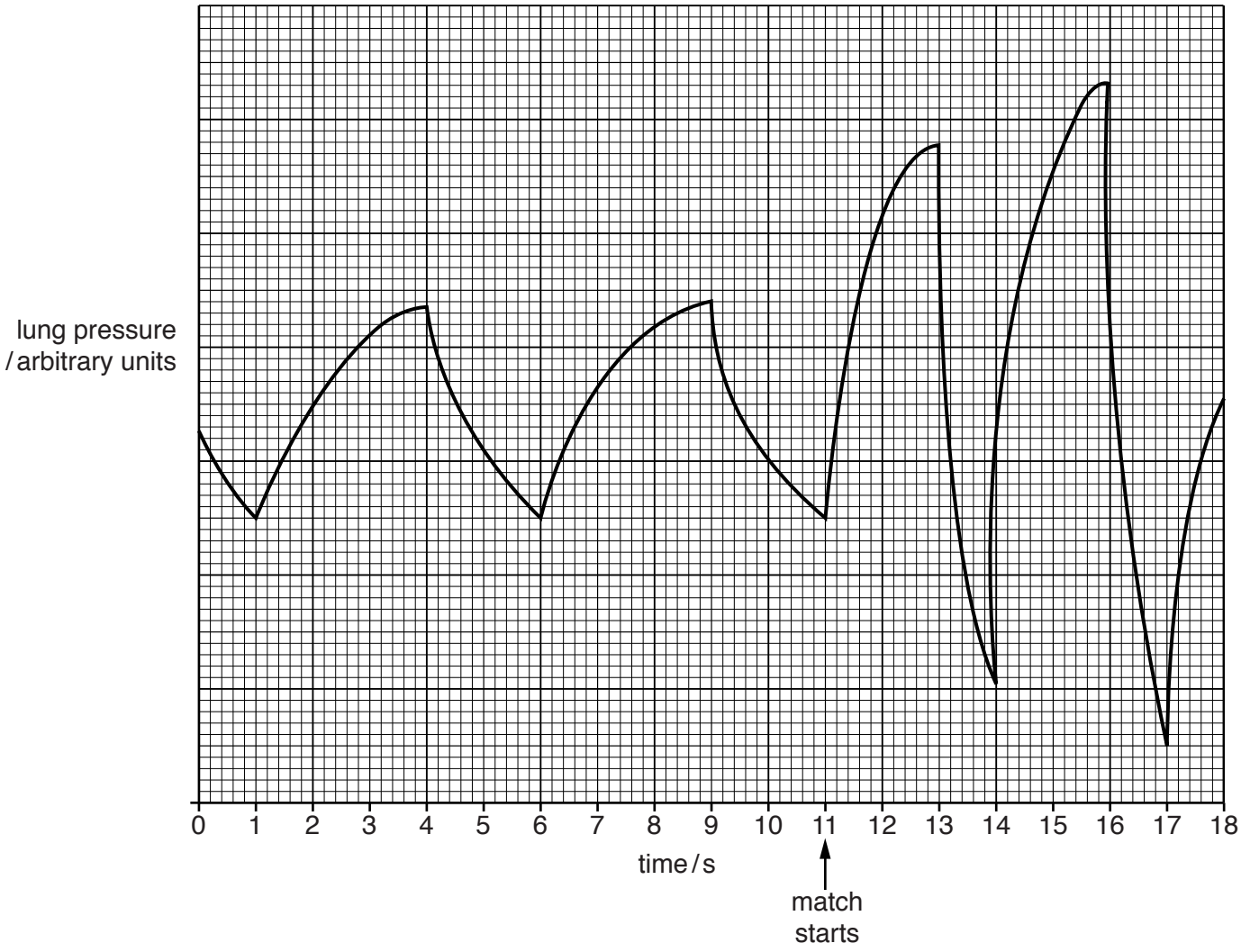

Fig. 2.1

(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.

View solution

.....breaths per minute
[2]

(ii) Use the results in Fig. 2.1 to describe how the pattern of breathing during the match is different from the pattern of breathing before the match starts.

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.....[3]

(b) Describe the process of inhalation.

View solution

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.....[4]

(c) Carbon dioxide is excreted from the body through the lungs.

View solution

(i) Explain why this process is termed *excretion*.

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.....[1]

(ii) Name the part of the blood in which most carbon dioxide is transported. View solution

.....[1]

(iii) Describe the effect of increased carbon dioxide concentration on blood pH. View solution

.....[1]

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

View solution

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

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.....[2]

[Total: 14]

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

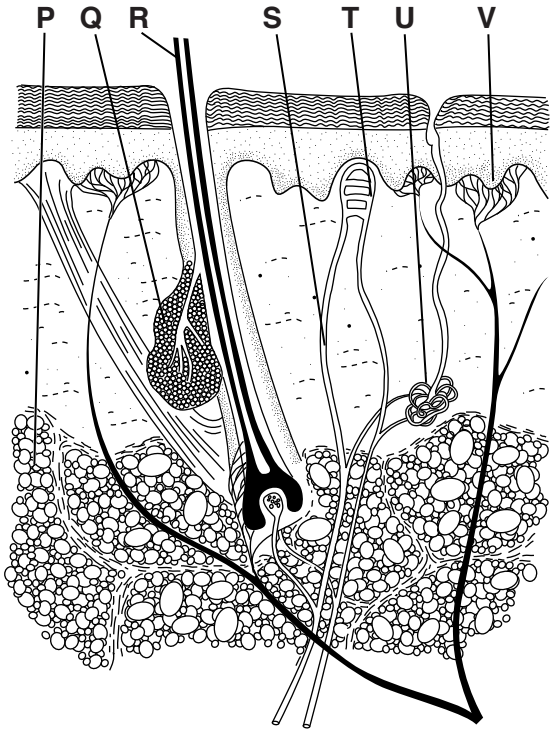

Fig. 3.1

View solution

(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]

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(b) The response of the skin to cold weather is an involuntary action.

View solution

Explain how an involuntary action differs from a voluntary action.

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.....[3]

(c) Describe how the nervous system coordinates the response of the skin to cold weather.

View solution

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.....[4]

(d) Explain how negative feedback is involved in the control of body temperature.

View solution

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.....[3]

[Total: 13]

4 Leaves are made of tissues.

(a) Define the term *tissue*.

View solution

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.....[1]

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

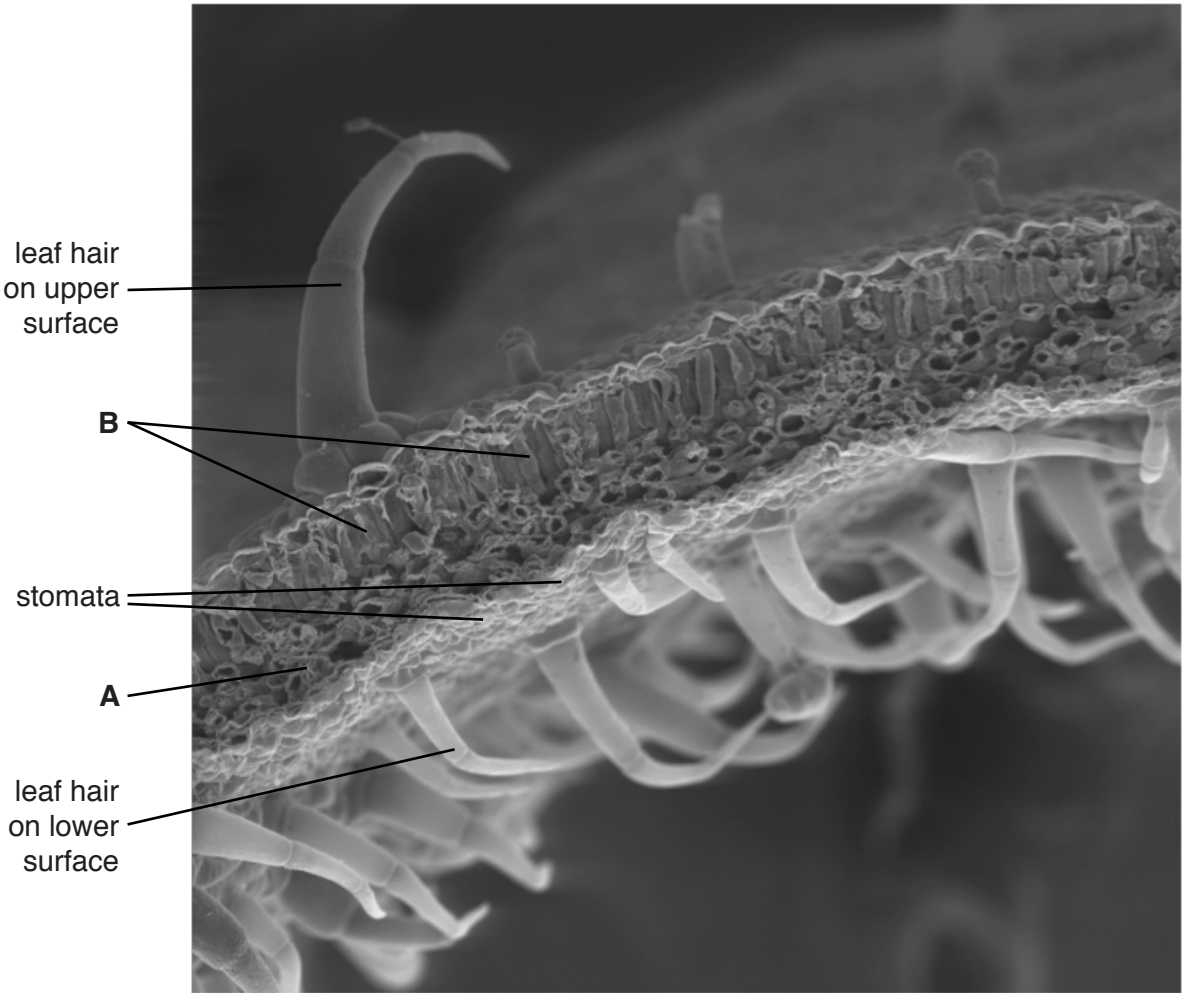

Fig. 4.1

(b) Name:

View solution

(i) tissue **A**

.....[1]

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

View solution

.....[1]

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

View solution

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.....[2]

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

View solution

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.....[4]

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

View solution

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

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.....[1]

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

View solution

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.....[2]

[Total: 12]

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

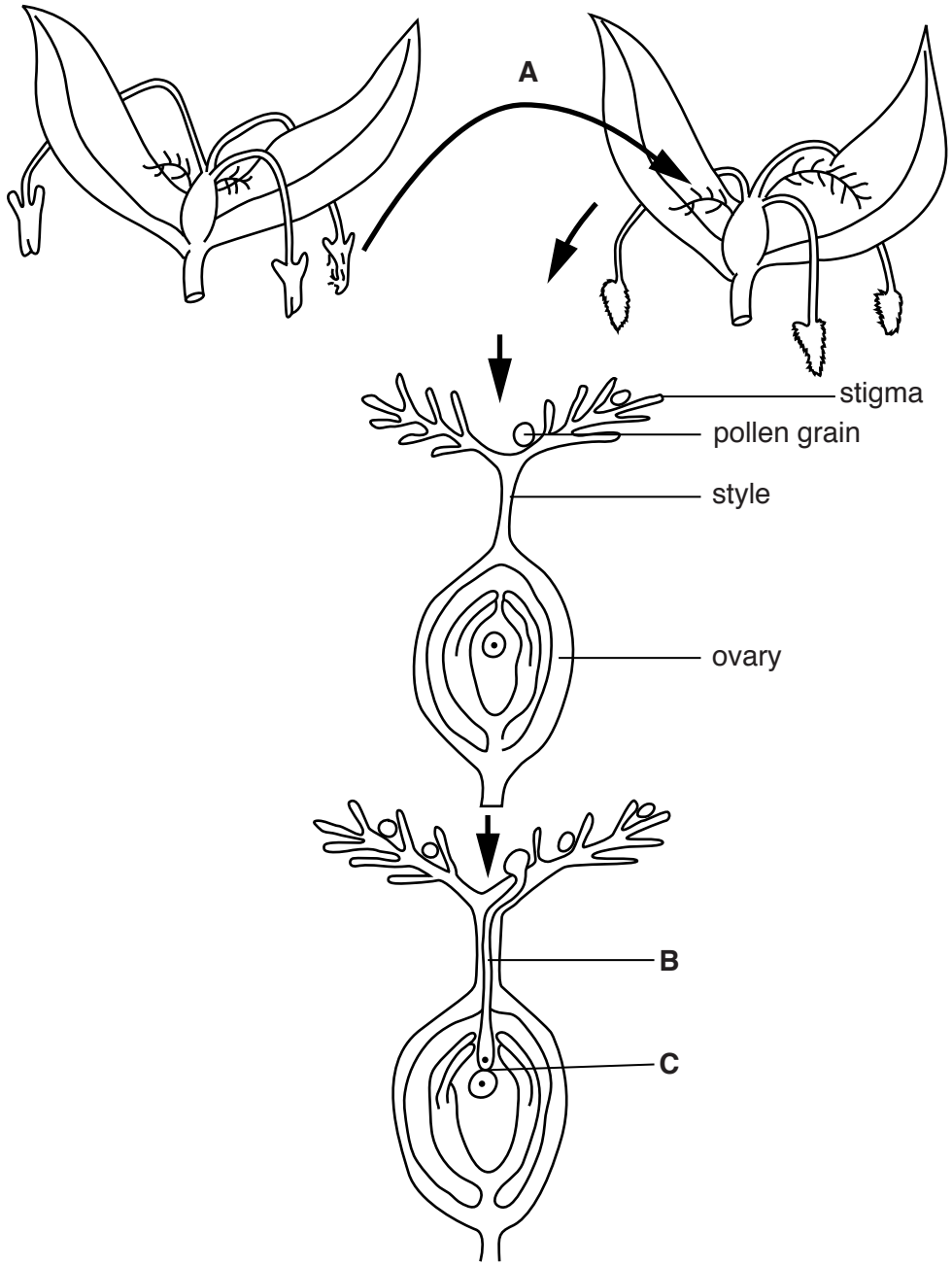

Fig. 5.1

View solution

(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 .....

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.....

[3]

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

State the name for this type of pollination.

View solution

.....[1]

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

View solution

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.....[2]

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

View solution

Describe what happens at fertilisation in flowering plants.

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.....[2]

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

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

View solution

.....[1]

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

View solution

.....[1]

(iii) State an advantage of seed dispersal.

View solution

.....

.....[1]

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(f) Seed germination occurs when conditions are suitable.

View solution

Explain the role of enzymes in seed germination.

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.....[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 tonnes		
	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

View solution

(a) Many governments aim to recycle at least 50% of all household waste.
In 2008, 2558 thousand tonnes 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.

View solution

Suggest a reason for this slight decrease.

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.....[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]

View solution

(b) The recycling of paper and paper packaging uses fewer resources than making paper from trees.

View solution

Describe how paper is recycled.

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.....[4]

(c) Most waste that is not recycled is put in landfill sites or burnt. Greenhouse gases are produced at landfill sites and by burning.

Explain the likely consequences of an increase in the concentration of greenhouse gases in the atmosphere.

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.....[4]

[Total: 12]

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