Inheritance

Question Paper 6

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Inheritance
Paper Type	(Extended) Theory Paper
Booklet	Question Paper 6

Time Allowed: **57 minutes**

Score: **/47**

Percentage: **/100**

1 One variety of the moth, *Biston betularia*, has pale, speckled wings. A second variety of the same species has black wings. There are no intermediate forms.

Equal numbers of both varieties were released into a wood made up of trees with pale bark. Examples of these are shown in Fig. 5.1.

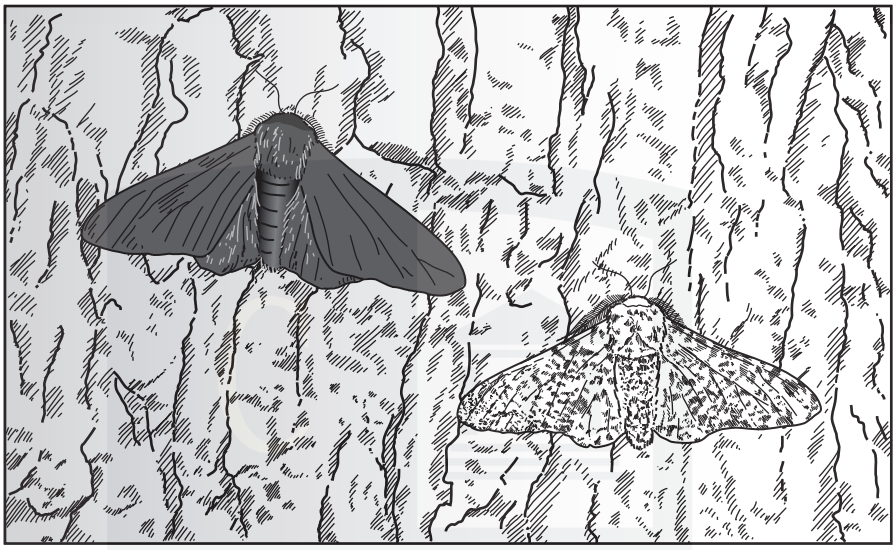

Fig. 5.1

After two weeks as many of the moths were caught as possible.
The results are shown in Table 5.1.

Table 5.1

wing colour of moth	number released	number caught
pale, speckled	100	82
black		36

(a) (i) Suggest and explain **one** reason, related to the colour of the bark, for the difference in numbers of the varieties of moth caught.

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..... [1]

(ii) Suggest and explain how the results may have been different if the moths had been released in a wood where the trees were blackened with carbon dust from air pollution.

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..... [2]

Table 5.2 shows the appearance and genetic make-up of the different varieties of this species.

Table 5.2

wing colour	genetic make-up
pale, speckled	GG; Gg
black	

(b) (i) State the appropriate genetic terms for the table headings.

wing colour .....

genetic make-up ..... [2]

(ii) State and explain which wing colour is dominant.

dominant wing colour .....

explanation .....

..... [2]

(c) State the type of genetic variation shown by these moths. Explain how this variation is inherited.

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..... [3]

(d) Heterozygous moths were interbred. Use a genetic diagram to predict the proportion of black winged moths present in the next generation.

proportion of black winged moths = ... [5]

(e) (i) Name the process that can give rise to different alleles for wing colour in a population of moths.

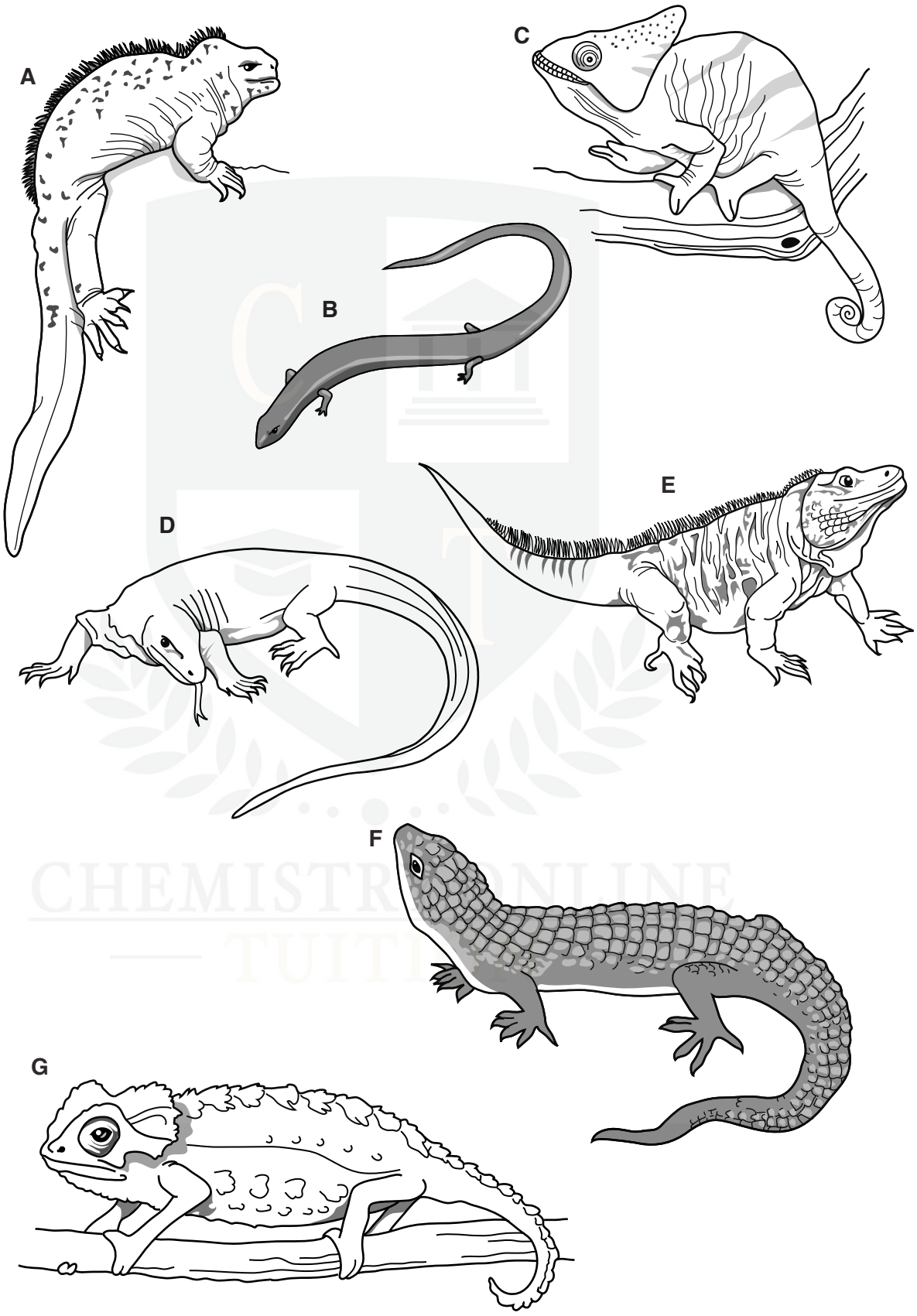
..... [1]

(ii) Suggest **one** factor which might increase the rate of this process.

..... [1]

[Total: 17]

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



(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.

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.

Explain why conserving lizards is important.

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.....[3]

(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.

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.....[2]

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

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.....[2]

(d) Sexual reproduction requires meiosis to occur.

(i) Define the term *meiosis*.

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

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.....[3]

[Total: 16]

3 **(a)** Fig. 4.1 shows a section through the anther of a lily flower. The cells in the centre are dividing by meiosis.

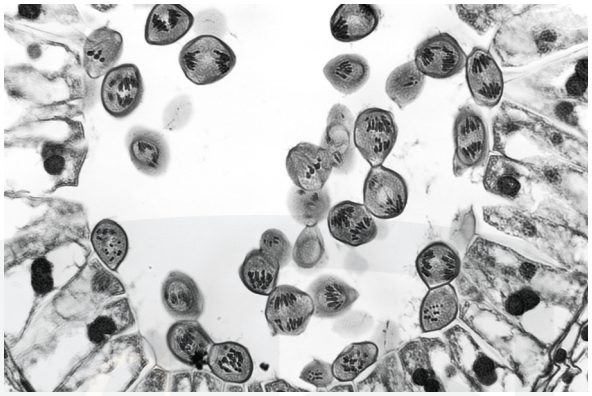

Fig. 4.1

(i) Name the product of meiosis that is formed in anthers.

.....[1]

(ii) Explain the importance of meiosis in sexual reproduction.

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.....[2]

(b) Fig. 4.2 shows a flower of *Lilium polyphyllum*, a lily that grows in the Himalayan mountains. This species is cross-pollinated by insects.

Fig. 4.2

(i) Explain what is meant by *cross-pollination*.

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.....[2]

(ii) Name **one** feature **visible** in Fig. 4.2 that helps to attract insects.

.....[1]

(c) Plants of this species that grow at low altitudes produce flowers 60 days before the plants of the same species that grow at high altitudes.

(i) Suggest **one** environmental reason why lilies that grow at lower altitudes flower earlier than the lilies at higher altitudes.

.....[1]

(ii) Explain why flowering time is an example of continuous variation.

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.....[2]

(d) Scientists think that plants of *L. polyphyllum* growing at high altitudes may evolve into a new species.

Explain how natural selection could lead to the evolution of a new species of lily.

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.....[5]

[Total: 14]