

Inheritance

Question Paper 6

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|-------------------|-------------------------|
| 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.

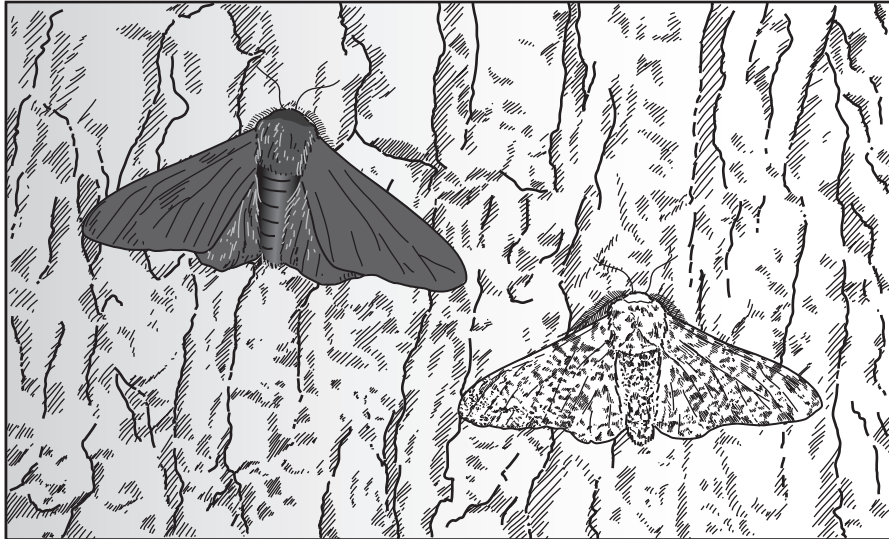


Fig. 5.1

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.

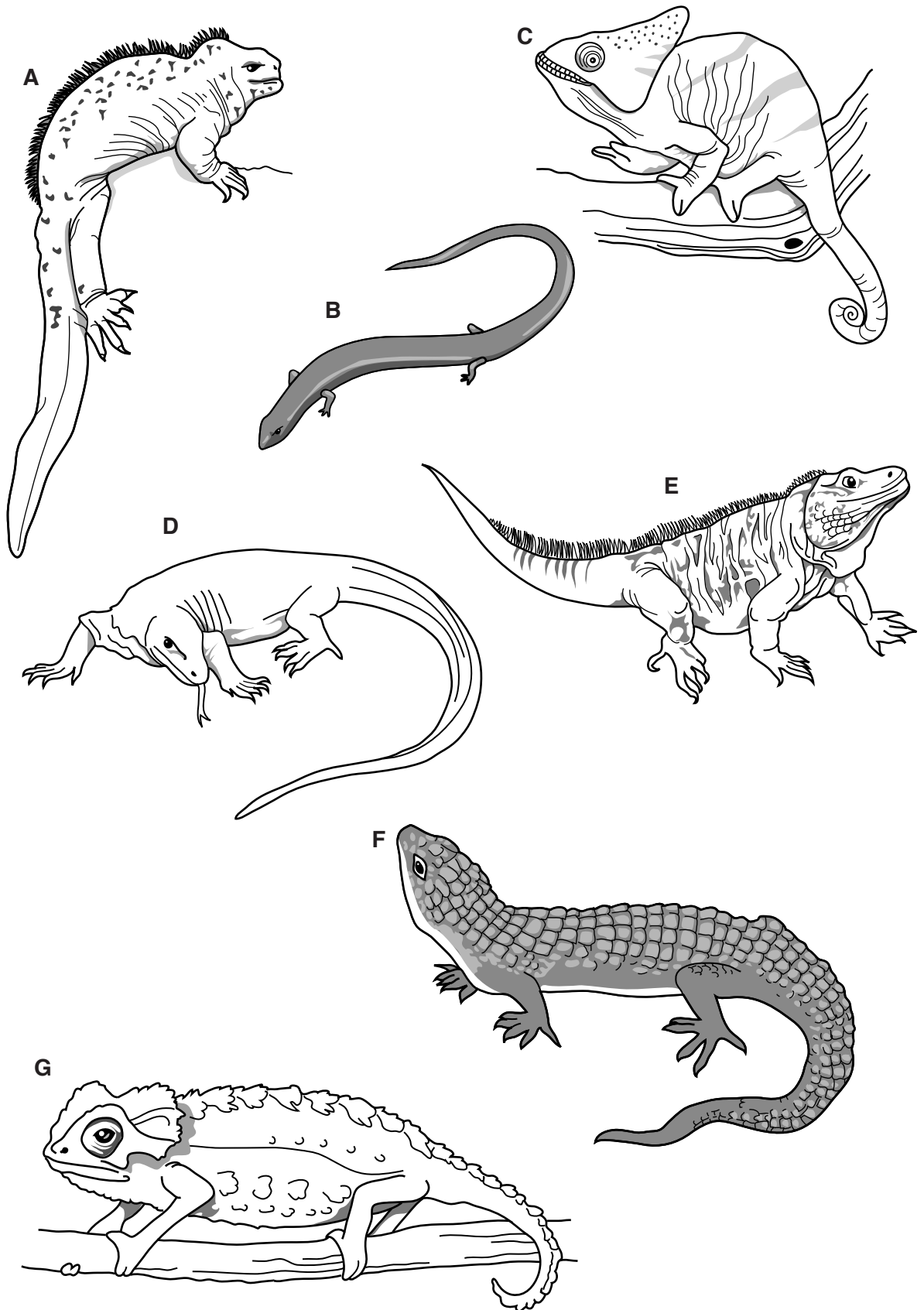
..... [1]

- (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.



(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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(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.

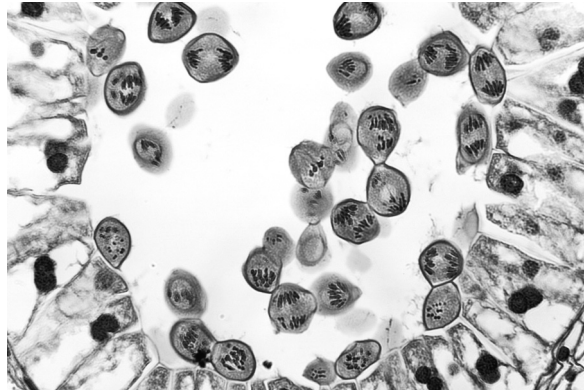


Fig. 4.1

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

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- (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.

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(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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[Total: 14]