

Variation and Selection

Question Paper 1

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| Level | IGCSE |
| Subject | Biology (0610/0970) |
| Exam Board | Cambridge International Examinations (CIE) |
| Topic | Variation and Selection |
| Sub-Topic | |
| Booklet | Question Paper 1 |

Time Allowed: 38 minutes

Score: /32

Percentage: /100

Grade Boundaries:

| | | | | | | | | |
|------|-----|-----|-----|-----|-----|-----|-----|------|
| 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| >85% | 75% | 68% | 60% | 53% | 48% | 40% | 33% | <25% |

1 What is a mutation?

- A** a change in a gene or chromosome
- B** a condition caused by a dominant allele
- C** a process used in genetic engineering
- D** a type of continuous variation

2 Which characteristic shows discontinuous variation in humans?

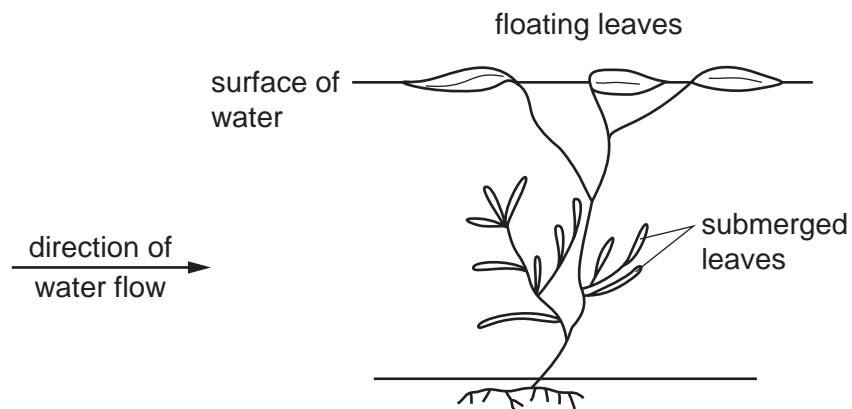
- A** height
- B** length of foot
- C** tongue rolling
- D** weight

3 The whole of an island's population of short-haired bumblebees is descended from just two parents. These were introduced from the mainland.

Which statement about the island's short-haired bumblebee population, compared with that of the mainland, is correct?

- A** The population is less in danger of collapsing from disease.
- B** The population is more able to adapt to environmental changes.
- C** The population shows more genetic variety.
- D** The population will adapt to environmental changes more slowly.

4 The diagram shows a hydrophyte in a river.



Which statement about the submerged leaves is correct?

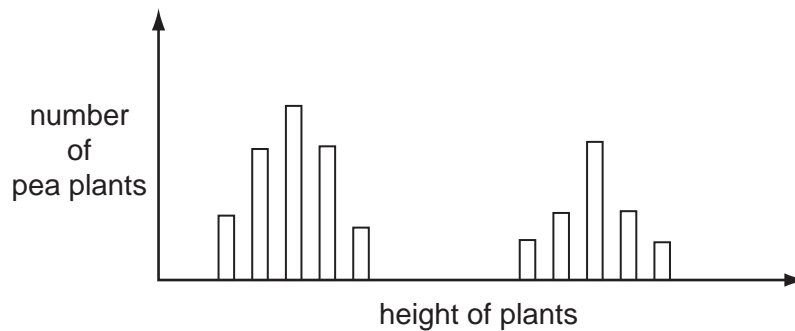
- A They cannot photosynthesise.
- B They have a thick cuticle.
- C They offer little resistance to water flow.
- D They require many xylem vessels for support.

5 Some disease-causing bacteria survive treatment with an antibiotic.

Which statement about the surviving bacteria is correct?

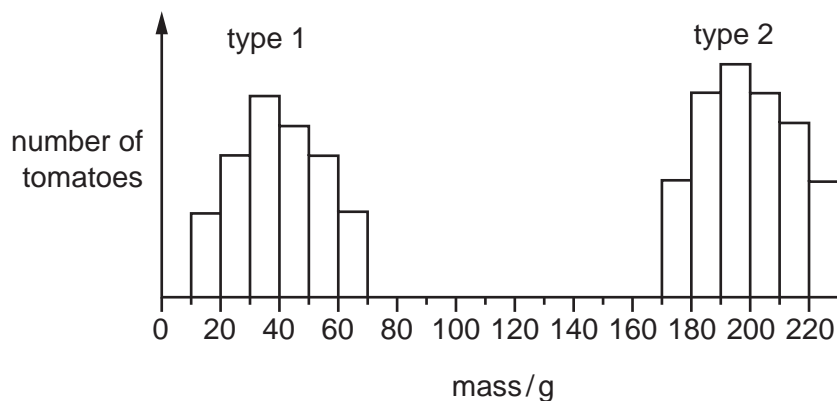
- A The antibiotic will work better on the next generation of bacteria.
- B The bacteria have undergone a process of natural selection.
- C The bacteria will now be resistant to all antibiotics.
- D The resistance of the bacteria is a result of selective breeding.

- 6 The bar chart shows the heights of pea plants grown from 500 pea seeds.



What variation do the plants show?

- A continuous variation only
 - B discontinuous variation only
 - C both continuous variation and discontinuous variation
 - D neither continuous variation nor discontinuous variation
- 7 What is an example of a characteristic that shows discontinuous variation in humans?
- A blood group
 - B body mass
 - C height
 - D width of hand
- 8 The graph shows the masses of two different types of tomato.



What can be concluded from the graph?

- A Genes do not affect the mass of tomatoes.
- B Type 1 tomatoes show continuous variation.
- C Type 2 tomatoes are sometimes smaller than type 1 tomatoes.
- D Type 2 tomatoes show discontinuous variation.

- 9 A man who was blood group A and a woman who was blood group B had four children, each with a different blood group A, B, AB and O.

Which type of variation does this demonstrate?

- A continuous, environmental and genetic
 - B continuous and genetic only
 - C discontinuous, environmental and genetic
 - D discontinuous and genetic only
- 10 Which is a sudden change in a gene or chromosome?
- A allele
 - B genotype
 - C mutation
 - D phenotype
- 11 What is **not** a feature of hydrophytes?
- A large air spaces in the tissues
 - B leaves rolled up and covered with hairs
 - C leaves with stomata on the upper surface
 - D roots and xylem reduced
- 12 What is **not** a feature of natural selection?
- A competition for resources
 - B production of many offspring
 - C selection by humans
 - D variation within the population

13 Cacti have fewer stomata than other plants.

How does this help them to survive in desert conditions?

- A It increases loss of water.
- B It increases uptake of carbon dioxide.
- C It reduces loss of water.
- D It reduces uptake of carbon dioxide.

14 What is **unlikely** to be affected by the environment?

- A blood group
- B body mass
- C health
- D height

15 What makes tongue rolling an example of discontinuous variation?

- A A person can roll their tongue only when they are young.
- B There are many different types of tongue rollers.
- C Tongue rolling has to be learnt.
- D Tongue rolling is something that a person either can or cannot do.

16 What is an example of continuous variation?

- A blood group
- B gender
- C height
- D tongue rolling

17 The distribution of the sickle-cell allele in human populations varies in different areas of the world.

What is an explanation for this difference?

- A** People that are heterozygous for the sickle-cell allele have a resistance to cholera.
- B** People that are heterozygous for the sickle-cell allele have a resistance to malaria.
- C** People that are heterozygous for the sickle-cell allele are more likely to suffer from anaemia.
- D** People with sickle-cell anaemia have more alleles.

18 When growing millet, farmers choose seeds from high-yielding plants.

Which biological practice is this an example of?

- A** adaptation
- B** artificial selection
- C** evolution
- D** natural selection

19 Which feature is an example of discontinuous variation?

- A** blood group
- B** body mass
- C** foot size
- D** height

20 Which description of an adaptive feature is correct?

- A** a change in phenotype that is caused by the environment
- B** a change in the environment that is an advantage to an organism
- C** an action by an organism that aids its ability to survive and reproduce
- D** an inherited feature that increases an organism's ability to survive and reproduce

21 Which human phenotype is affected by environmental and genetic factors?

- A blood group
- B body size
- C gender
- D tongue rolling

22 Which adaptation may be present in a xerophyte?

- A leaves with small surface area and large numbers of stomata
- B little or no xylem tissue and leaves with large surface area
- C stomatal hairs and rolled leaves
- D thin or no cuticle and deep roots

23 How does artificial selection differ from natural selection ?

- A Selection changes the characteristics of living things.
- B Selection is based on genetic variation.
- C Selection is not based on adaptation to their environment.
- D Selection occurs over many generations.

24 The number of bacteria resistant to antibiotics is increasing.

What has contributed to this situation?

- A choosing the antibiotic carefully to match the strain of bacterium
- B not completing the course of prescribed antibiotics
- C tracing, testing and treating people who have been in contact with the infected person
- D using antibiotics only when essential

25 Which row best describes human blood groups?

| | affected by environment | has no intermediate phenotypes | shows continuous variation | shows discontinuous variation |
|----------|-------------------------|--------------------------------|----------------------------|-------------------------------|
| A | ✓ | x | ✓ | x |
| B | ✓ | x | x | ✓ |
| C | x | ✓ | ✓ | x |
| D | x | ✓ | x | ✓ |

26 During sexual reproduction in plants, what will give rise to the greatest variation in the offspring?

- A** All of the flowers on the same plant have male and female reproductive organs.
- B** The anthers and stigmas on the same plant mature at the same time of year.
- C** There are separate male and female flowers on the same plant.
- D** There are separate male and female plants.