Variation and selection – 2020 IGCSE 0610

1. March/2020/Paper_12/No.34

What applies to selective breeding but **not** to natural selection?

A Humans select individuals with desirable features.

B Individuals may produce a large number of offspring.

C Individuals pass their alleles to the next generation.

D There is variation among the offspring produced.

2. March/2020/Paper_32/No.3

(a) The length of hair in cats is controlled by a single gene.

- The allele for short hair is dominant – **H**
- The allele for long hair is recessive – **h**

Fig. 3.1 is a photograph of two cats.

cat A **cat B**

Fig. 3.1

(i) Table 3.1 shows some of the genetic and physical features of the cats in Fig. 3.1.

Complete Table 3.1.

Table 3.1

	cat **A**	cat **B**
phenotype	long hair	.....
genotype	.....	**HH** or .....

[3]

(ii) State the genotype of a pure-breeding short-haired cat.

..... [1]

(iii) Two cats with the genotypes **HH** and **hh** were bred together.

Predict the percentage of offspring that are heterozygous.

.....% [1]

(b) The statements describe features of continuous or discontinuous variation.

Identify the type of variation each statement describes.

Write the letter **C** for continuous variation or **D** for discontinuous variation in the spaces provided.

Height is an example of this type of variation. .....

There are no intermediate phenotypes with this type of variation. .....

This type of variation results in a limited number of phenotypes. .....

[2]

(c) A student wrote a definition of variation as:

'the similarities between individuals of the same kingdom'.

Identify the **two incorrect** words in the student's definition.

1 .....

2 .....

[2]

[Total: 9]

3. June/2020/Paper_11/No.33

Pea plants produce either yellow or green seeds. Yellow (Y) is dominant to green (y).

What are the most likely phenotypes of the offspring of a cross between YY and Yy plants?

A 50% yellow and 50% green

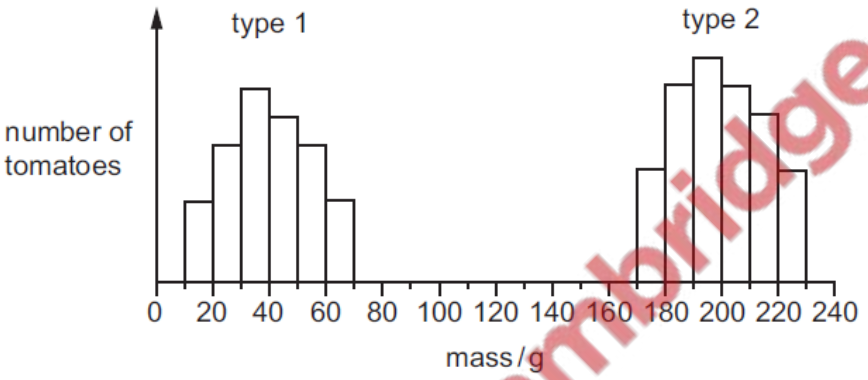
B 75% yellow and 25% green

C 100% yellow

D 100% green

4. June/2020/Paper_11/No.34

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.

5. June/2020/Paper_12/No.32

Which statement about the human sex chromosomes is correct?

A Females have an X chromosome and a Y chromosome.

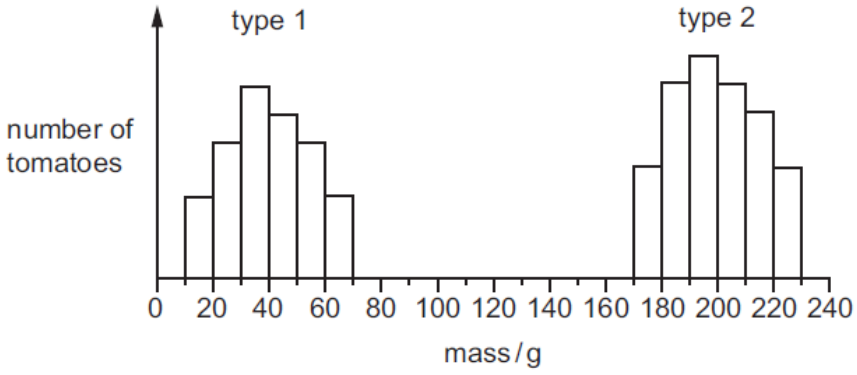
B Females have two Y chromosomes.

C Males and females have at least one X chromosome.

D Males and females have at least one Y chromosome.

6. June/2020/Paper_12/No.34

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.

7. June/2020/Paper_21/No.34

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

8. June/2020/Paper_22/No.34

Which adaptation may be present in a xerophyte?

A leaves with small surface area and large numbers of stomata

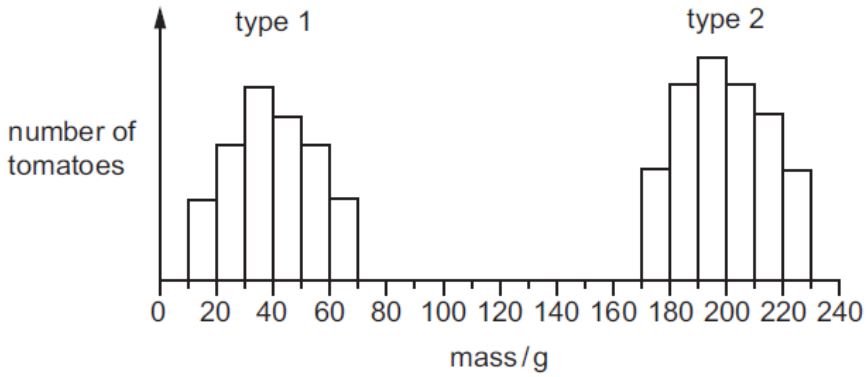
B little or no xylem tissue and leaves with large surface area

C stomatal hairs and rolled leaves

D thin or no cuticle and deep roots

9. June/2020/Paper_22/No.33

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.

10. June/2020/Paper_22/No.34

Which adaptation may be present in a xerophyte?

A leaves with small surface area and large numbers of stomata

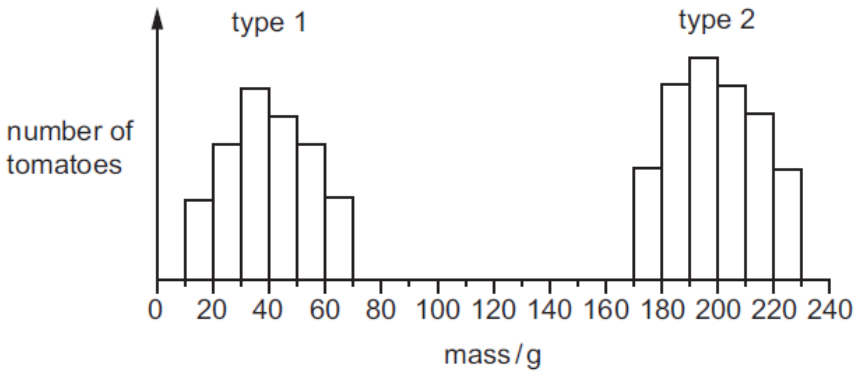
B little or no xylem tissue and leaves with large surface area

C stomatal hairs and rolled leaves

D thin or no cuticle and deep roots

11. June/2020/Paper_23/No.34

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.

12. June/2020/Paper_42/No.3

Cheetahs, *Acinonyx jubatus*, are carnivores found in the dry grasslands and woodlands of southern Africa. Cheetahs hunt for food during the day. They eat deer and antelope.

The cheetah is the fastest mammal on land but can only run at high speed (sprint) over a short distance. Its hunting strategy is to creep up on prey and then sprint to catch them.

Fig. 3.1 is a photograph of a cheetah in its natural habitat.

Fig. 3.1

(a) Suggest how these adaptive features enable cheetahs to survive in their natural environment.

fur colouring .....

.....

.....

streamlined body shape .....

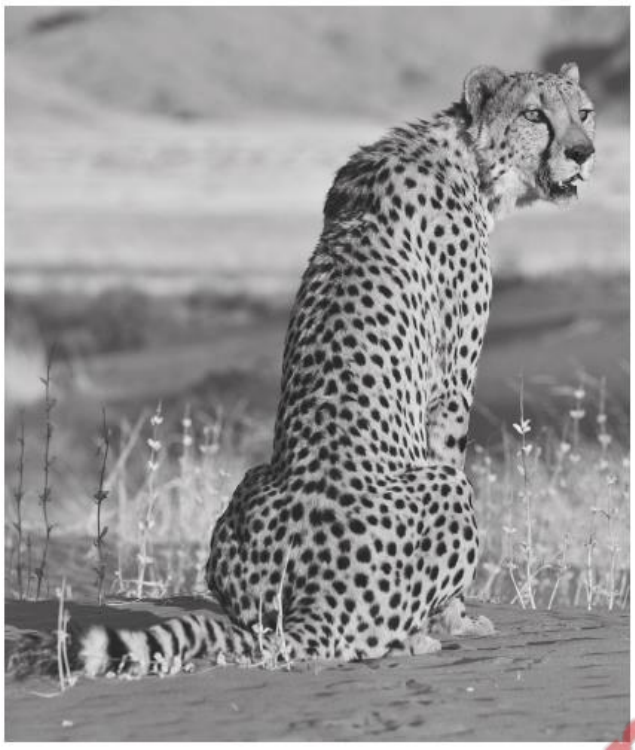
.....

.....

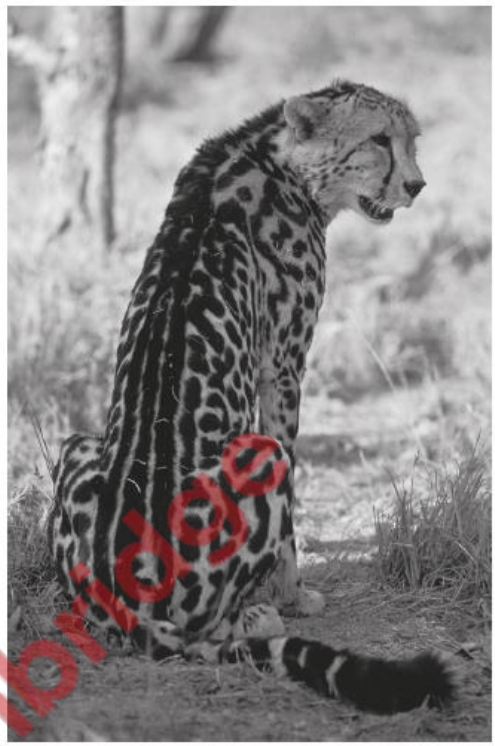
[2]

(b) The king cheetah is a rare variety of *A. jubatus* that has inherited striped fur markings.

Fig. 3.2 shows a cheetah with spots and a king cheetah.



cheetah with spots



king cheetah

Fig. 3.2

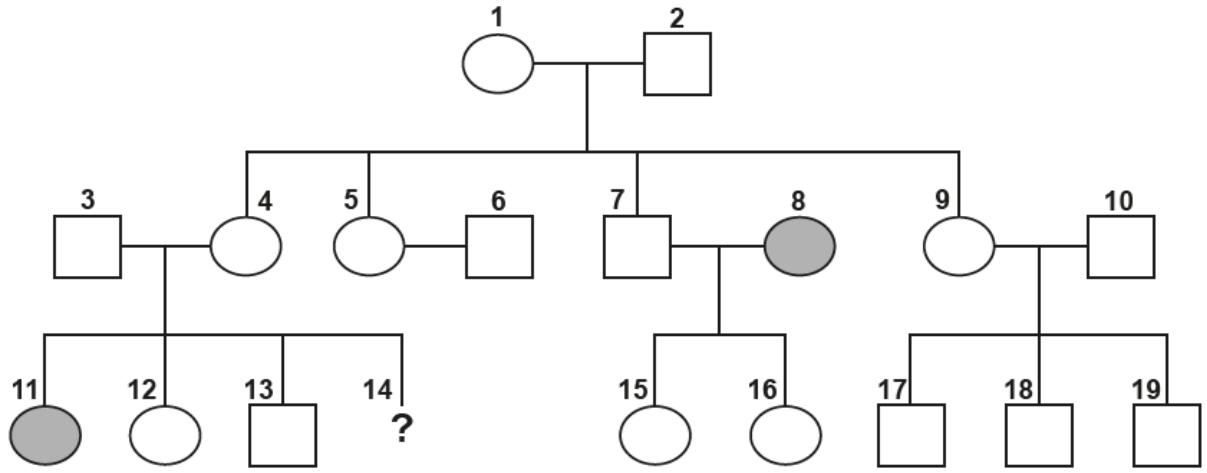
(i) Define the term *inheritance*.

.....

.....

..... [1]

Fig. 3.3 shows a pedigree diagram of a population of cheetahs.



Key:

female king cheetah

female cheetah with spots

male king cheetah

male cheetah with spots

Fig. 3.3

(ii) Deduce the genotype of cheetah **11**.

..... [1]

(iii) Predict the probability of cheetah **14** being a king cheetah.

..... [1]

(iv) Describe how a breeder could determine the genotype of cheetah **17**.

.....

.....

.....

.....

..... [2]

(v) When the king cheetah was first discovered it was thought that it was a new species.

Pedigree diagrams of cheetahs proved it was not a new species.

Suggest **one** type of evidence, other than pedigree diagrams, that can be used to determine how closely related organisms are.

.....

.....

..... [1]

(c) Cheetahs are at risk of becoming endangered.

(i) Suggest why the cheetah is at risk of becoming endangered.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) Describe how species like the cheetah can be conserved.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 14]

13. June/2020/Paper_42/No.5

The Galápagos Islands are a group of small islands in the Pacific Ocean.

In 1839 Charles Darwin published a book that described differences in a family of birds called finches.

Each species of Galápagos finch had:

- a different diet
- a different beak shape, as shown in Fig. 5.1.

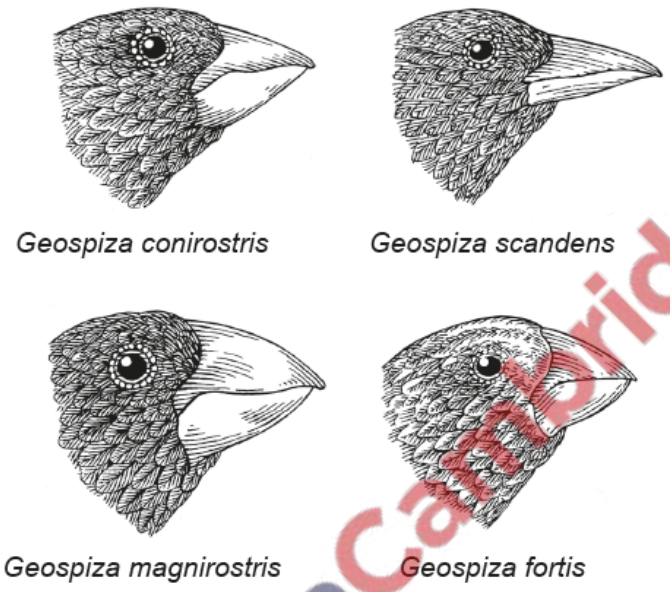


Fig. 5.1

(a) State the genus name for the Galápagos finches shown in Fig. 5.1.

..... [1]

Suggest how Galápagos finches have evolved different shaped beaks.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

[Total: 6]