Inheritance – 2020 IGCSE 0610

1. March/2020/Paper_12/No.32

Some features of cell division are listed.

1 involved in making gametes

2 involved in replacing cells

3 makes genetically different cells

4 makes genetically identical cells

Which features are involved in meiosis?

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

2. March/2020/Paper_12/No.33

Which cross will be pure-breeding?

A a female homozygous individual and a male heterozygous individual bred together

B a male homozygous individual and a female heterozygous individual bred together

C two identical heterozygous individuals bred together

D two identical homozygous individuals bred together

3. March/2020/Paper_42/No.5

(a) Mitosis is a type of nuclear division.

Fig. 5.1 is a series of photomicrographs showing a cell dividing by mitosis.

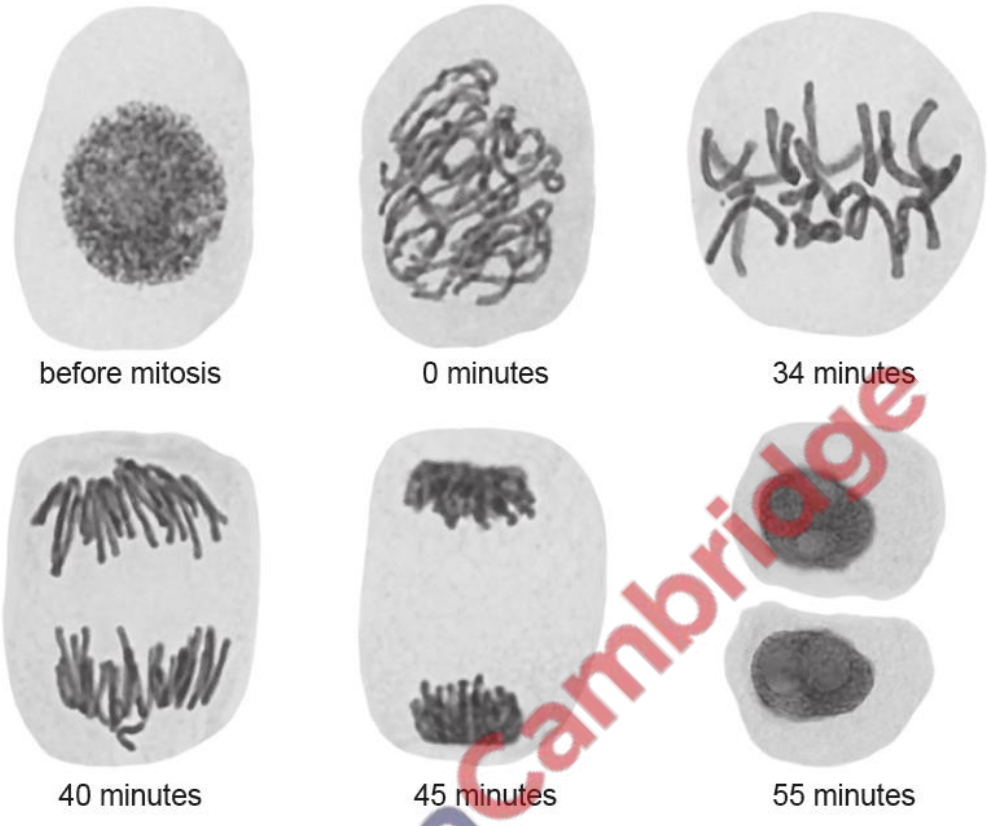

Fig. 5.1

(i) State the change that has occurred to the mass of DNA immediately before mitosis in Fig. 5.1.

..... [1]

(ii) Estimate the time when the chromosomes shown in Fig. 5.1 begin to separate.

..... [1]

(b) Meiosis is another type of nuclear division.

Describe how the nuclei in cells produced by meiosis differ from the nuclei in cells produced by mitosis.

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..... [3]

(c) Stem cells divide by mitosis during the growth of an embryo.

Describe the role of stem cells in the growth of an embryo.

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..... [2]

(d) An embryo develops into a fetus.

Outline the processes of labour and birth.

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..... [6]

[Total: 13]

4. 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

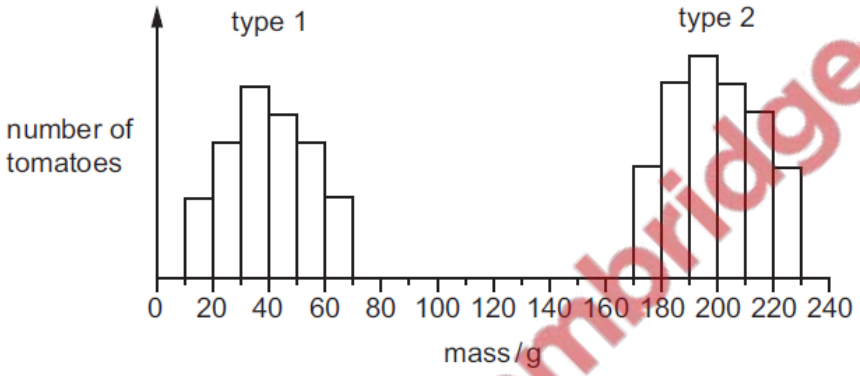
B 75% yellow and 25% green

C 100% yellow

D 100% green

5. 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.

6. June/2020/Paper_13/No.31

Fur colour in cats is an observable feature.

Which word is used to describe an observable feature?

A allele

B genotype

C heterozygous

D phenotype

7. June/2020/Paper_13/No.32

Which row shows the sex chromosomes in the body cells and in the gametes of a woman?

	body cells	gametes
A	XX	all X
B	XX	all XX
C	XY	X or Y
D	XY	all XY

8. June/2020/Paper_13/No.33

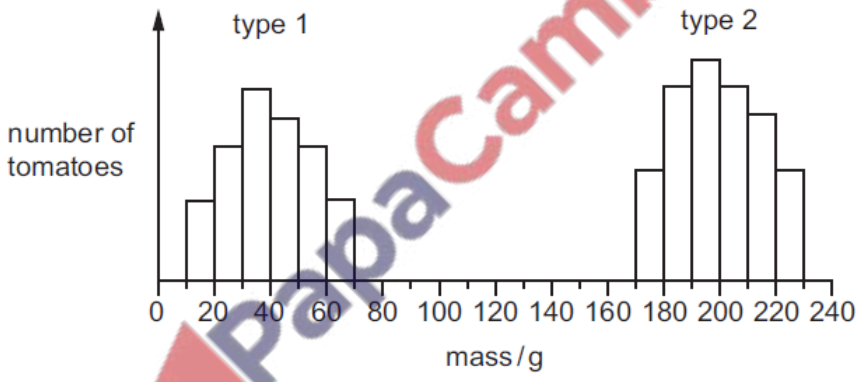
In mice, the allele for black hair is dominant to the allele for brown hair.

What proportion of offspring will have brown hair if a cross is made between a homozygous black mouse and a heterozygous black mouse?

A 0% **B** 25% **C** 50% **D** 100%

9. June/2020/Paper_13/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.

10. June/2020/Paper_21/No.30

Which cell contains a haploid nucleus?

A neurone

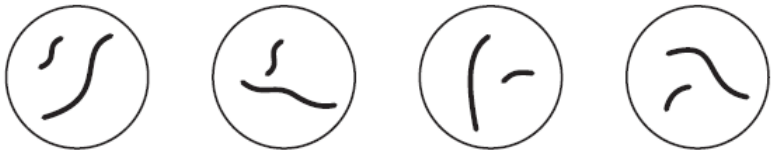
B sperm cell

C skin cell

D red blood cell

11. June/2020/Paper_21/No.31

The diagram shows the chromosomes of four daughter cells produced by meiosis.



Which parent cell produced these cells?

A 

B 

C 

D 

12. June/2020/Paper_21/No.32

When damaged tissues are repaired cells undergo division by

A meiosis to produce genetically identical cells.

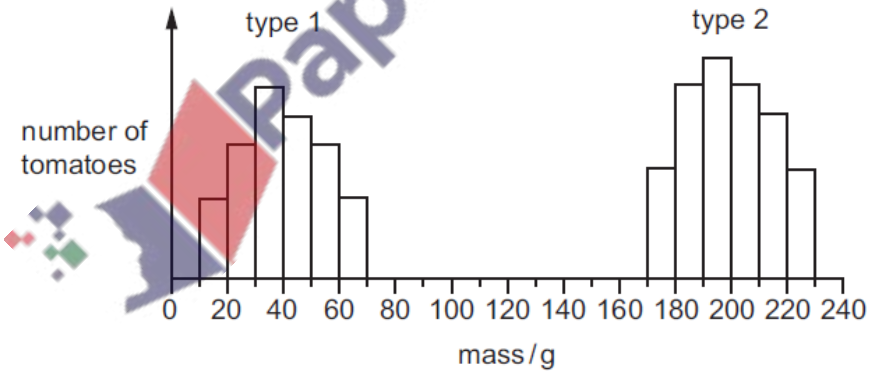
B meiosis to produce genetically different cells.

C mitosis to produce genetically identical cells.

D mitosis to produce genetically different cells.

13. June/2020/Paper_21/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.

14. June/2020/Paper_32/No.6

(a) A student wrote an incorrect definition of the term *hormone*.

The student's incorrect definition is shown in Fig. 6.1.

> *A hormone is an electrical substance, produced by a gland and carried by the neurones, which alters the activity of one or more specific target organs.*

Fig. 6.1

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

1 .....

2 .....

[2]

(b) Table 6.1 shows the names of some hormones and the glands where they are secreted.

Complete Table 6.1.

Table 6.1

hormone	gland
	adrenal
insulin	
oestrogen	
	testes

[4]

(c) Fig. 6.2 shows the position of some of the organs and endocrine glands in the body.

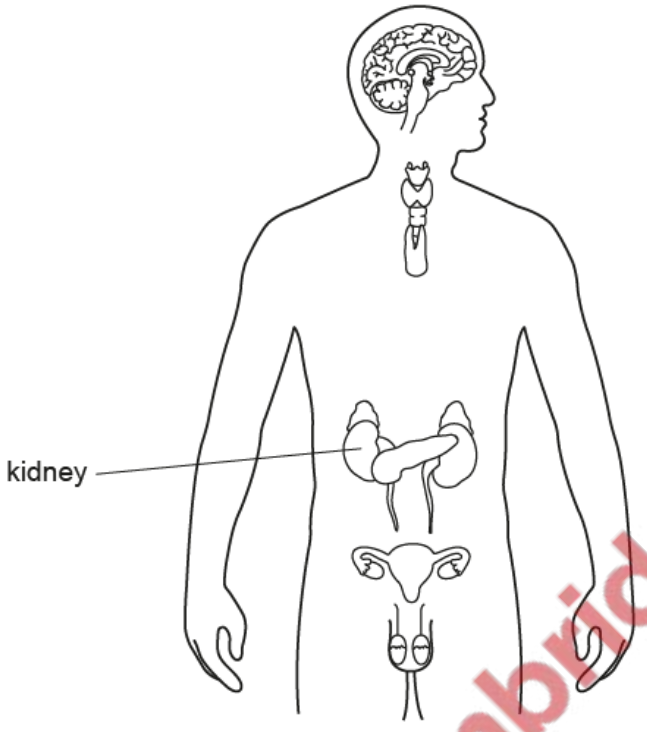


Fig. 6.2

Draw an **X on** Fig. 6.2 to identify an adrenal gland. [1]

(d) The list in Fig. 6.3 shows some of the changes that occur in boys and girls during puberty.

breasts grow	hair grows in armpits	pubic hair grows
hips widen	menstruation	testes grow

Fig. 6.3

(i) State **two** changes that occur in girls **only** from the list in Fig. 6.3.

1 .....

2 .....

[2]

(ii) State **one** change that occurs in **both** boys and girls from the list in Fig. 6.3.

..... [1]

[Total: 10]

15. June/2020/Paper_41/No.6

Colour blindness is a characteristic that is inherited. Colour blindness is more common in males than in females.

Fig. 6.1 is a pedigree diagram showing the inheritance of colour blindness in a family.

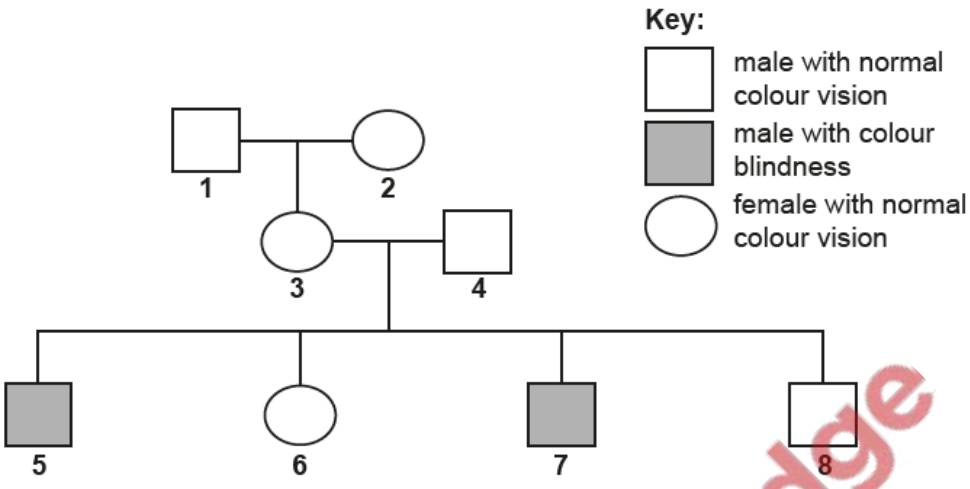


Fig. 6.1

(a) Define the term *inheritance*.

.....

.....

..... [1]

(b) **(i)** Using the symbols **B** and **b**, state the genotypes of individual **5** and individual **8** in the pedigree diagram.

5 .....

8 .....

[3]

(ii) Individual **3** is a carrier of colour blindness because she has one copy of the allele for colour blindness but has normal colour vision.

Describe the evidence from Fig. 6.1 that shows that individual **3** is a carrier.

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..... [3]

(iii) There was no history of colour blindness in the parents and grandparents of individuals **1** and **2**.

Suggest how colour blindness first occurred in the family in Fig. 6.1.

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..... [2]

[Total: 9]

16. June/2020/Paper_43/No.3

The American writer Ernest Hemingway lived on the island of Key West in Florida, USA in the 1930s. During this time he was given a male cat by a sea captain.

The cat had more toes than usual. This inherited condition is called polydactyly. The allele for polydactyly is dominant.

(a) Define the term inheritance.

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.....

..... [1]

(b) Fig. 3.1 is part of a pedigree diagram for Hemingway's cats.

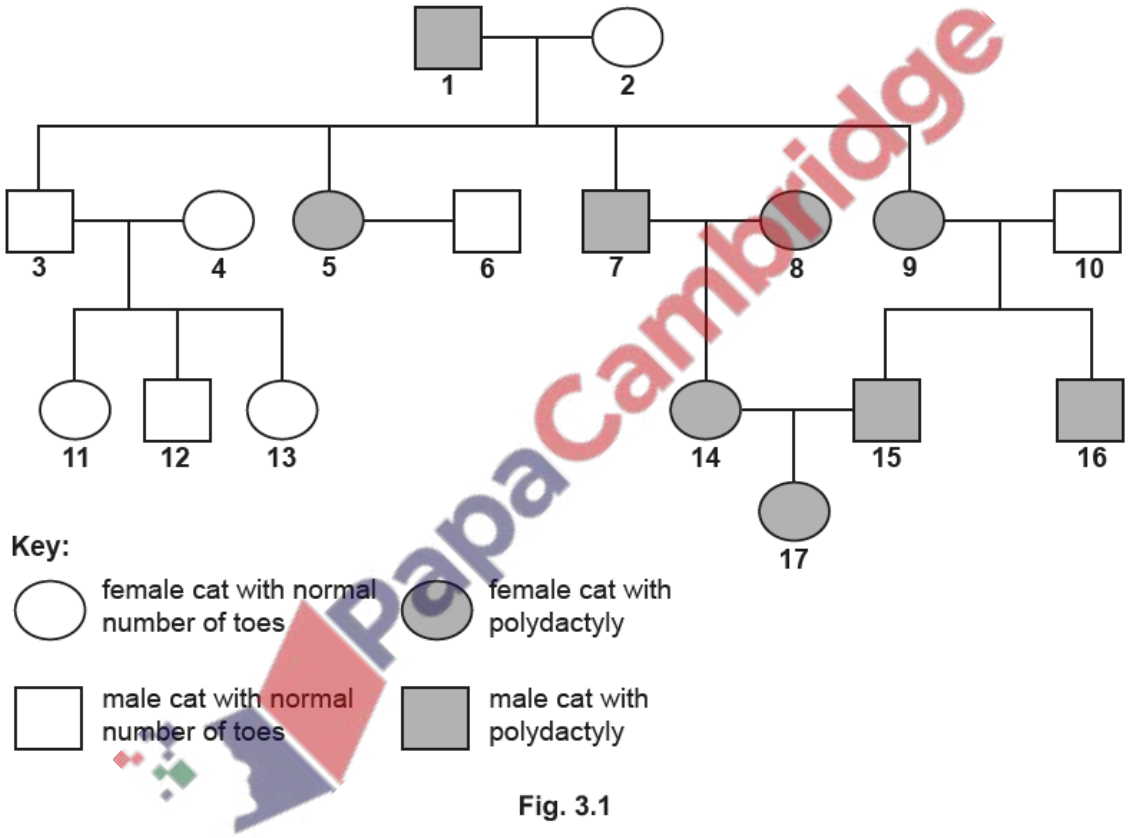

Fig. 3.1

(i) State the genotypes of cats **5**, **6** and **14** in the pedigree diagram in Fig. 3.1.

Use the letters **T** and **t**.

cat **5** .....

cat **6** .....

cat **14** .....

[3]

(ii) Explain why none of the offspring of cats **3** and **4** have inherited polydactyly.

Use the information in Fig. 3.1 in your answer.

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..... [1]

(c) Scientists published the results of an investigation into the DNA of cats with and without polydactyly. They compared the base sequence from a particular region of DNA that controls the development of the limbs.

Table 3.1 shows the base sequences.

Table 3.1

cats without polydactyly	AGA CAC AGA AAT GAG
Hemingway's cats with polydactyly	AGA CAC GGA AAT GAG
cats with polydactyly from Oregon and Missouri in the USA	AGA CAC GGA AAT GAG
cats with polydactyly from the UK	AGA CAC AGT AAT GAG

(i) Describe how the base sequences of the cats with polydactyly differ from the base sequence of cats without polydactyly.

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..... [2]

(ii) State the name of the process by which base sequences in DNA are changed.

..... [1]

(iii) The base sequences in Table 3.1 provide evidence that indicates which country the male cat given to Hemingway in the 1930s came from.

Suggest which country this cat came from **and** give a reason for your choice.

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..... [2]

(d) Fig. 3.2 shows part of a DNA molecule from a chromosome of a cat.

Complete Fig. 3.2 by writing the letters for the base sequence of the other strand of the DNA molecule.

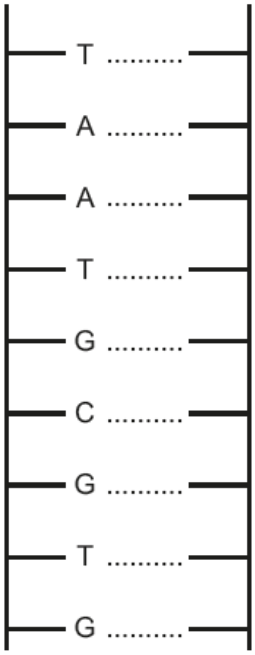

Fig. 3.2

[1]

(e) Explain why polydactyly is an example of discontinuous variation.

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..... [2]

[Total: 13]