Inheritance – 2022 June IGCSE 0610

1. June/2022/Paper_ 11/No.33

Beak shape in birds is controlled by genes passed from the parent birds to their offspring.

What is this an example of?

A selection

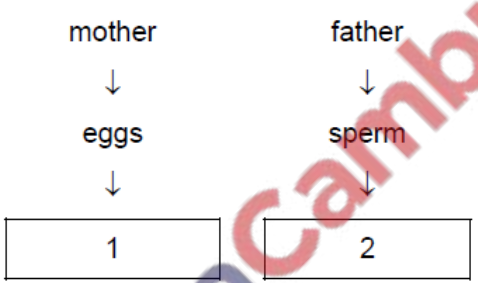
B fertilisation

C mitosis

D inheritance

2. June/2022/Paper_ 11/No.34

A student used a diagram to explain the inheritance of sex in humans.



Which statements should she use to complete boxes 1 and 2?

	box 1	box 2
A	all have an X chromosome	half have an X chromosome and half have a Y chromosome
B	all have a Y chromosome	half have an X chromosome and half have a Y chromosome
C	half have an X chromosome and half have a Y chromosome	all have an X chromosome
D	half have an X chromosome and half have a Y chromosome	all have a Y chromosome

3. June/2022/Paper_ 12/No.32

The diagram shows the inheritance of sex in humans.

		male gametes	
		X	Y
female gametes	X	XX	XY
	X	XX	XY

A man and a woman have one female child.

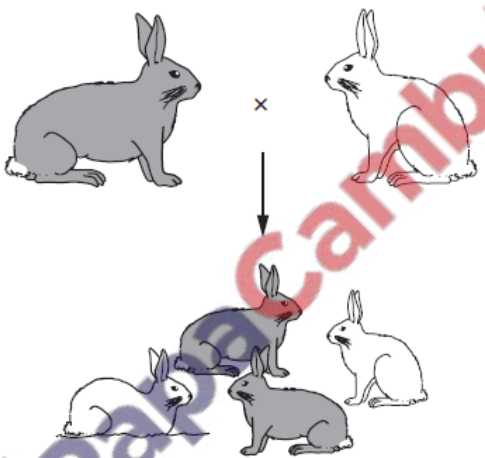
What is the chance of the couple's next child being female?

A 25% **B** 50% **C** 75% **D** 100%

4. June/2022/Paper_ 12/No.33

In rabbits, the allele for dark fur, R, is dominant to the allele for white fur, r.

The diagram shows a cross between a rabbit with dark fur and a rabbit with white fur.



What are the genotypes of the parents?

A Rr and rr **B** RR and rr **C** RR and Rr **D** R and r

5. June/2022/Paper_ 13/No.34

Which sex chromosomes in the egg cell and in the sperm will produce a female child?

	sex chromosome in the egg cell	sex chromosome in the sperm
A	X	X
B	X	Y
C	Y	X
D	Y	Y

6. June/2022/Paper_ 21/No.8

In a length of DNA, 20% of the bases were T.

What is the percentage of base G in this length of DNA?

A 10% **B** 20% **C** 30% **D** 80%

7. June/2022/Paper_ 21/No.31

Pangolins are mammals. One species of pangolin has 40 chromosomes per body cell.

How many chromosomes will a sperm cell from this species of pangolin have?

A 10 **B** 20 **C** 40 **D** 50

8. June/2022/Paper_ 21/No.30

What is needed in the cytoplasm to make proteins at a ribosome?

A DNA and amino acids

B DNA only

C mRNA and amino acids

D mRNA only

9. June/2022/Paper_ 21/No.37

With which kingdoms do bacteria share the same genetic code?

A animal, plant, fungus and protoctist

B animal, plant and fungus only

C animal and plant only

D animal only

10. June/2022/Paper_ 23/No.8

DNA is made up of .....1..... strands coiled together. The strands contain chemicals called .....2..... . These chemicals form .....3..... , A pairing with T and C pairing with G.

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
A	three	amino acids	cross-links
B	two	bases	cross-links
C	three	bases	proteins
D	two	amino acids	proteins

11. June/2022/Paper_ 23/No.30

Some fruit flies have orange eyes and others have red eyes.

If two orange-eyed fruit flies are crossed, their offspring always have orange eyes.

If two red-eyed fruit flies are crossed, their offspring can have orange eyes or red eyes.

What can be concluded from these observations?

A The allele for orange eyes is dominant.

B The allele for orange eyes is recessive.

C The alleles for orange and red eyes are codominant.

D This is an example of sex linkage.

12. June/2022/Paper_ 23/No.32

A woman with normal colour vision is a carrier for the colour blindness allele (X^BX^b). She has a male child with a man who has normal colour vision (X^BY).

What is the chance of the male child being colour-blind?

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

13. June/2022/Paper_ 23/No.33

Sickle cell anaemia is a genetic disorder which results in severe illness in homozygous individuals. In some human populations, being heterozygous can be beneficial.

What could be the reason for this?

A Heterozygous individuals are not affected by the disorder.

B Heterozygous individuals are more resistant to malaria.

C The disorder is caused by a dominant allele.

D The disorder is sex-linked.

14. June/2022/Paper_ 23/No.34

Which statement about selective breeding is correct?

A It does not involve humans.

B It involves a struggle for survival.

C It always involves only one parent.

D It involves parents that possess desirable features.

15. June/2022/Paper_ 31/No.3(a_ d)

The inheritance of coat texture in guinea pigs is controlled by a single gene.

(a) Define the term gene.

.....

.....

.....

..... [2]

(b) Fig. 3.1 shows a photograph of a guinea pig with a rough coat and a guinea pig with a smooth coat.

rough coat smooth coat

Fig. 3.1

The allele for a rough coat is dominant and represented by the letter **R**.
The allele for a smooth coat is recessive and represented by the letter **r**.

Fig. 3.2 is a pedigree diagram showing the inheritance of coat texture in some guinea pigs.

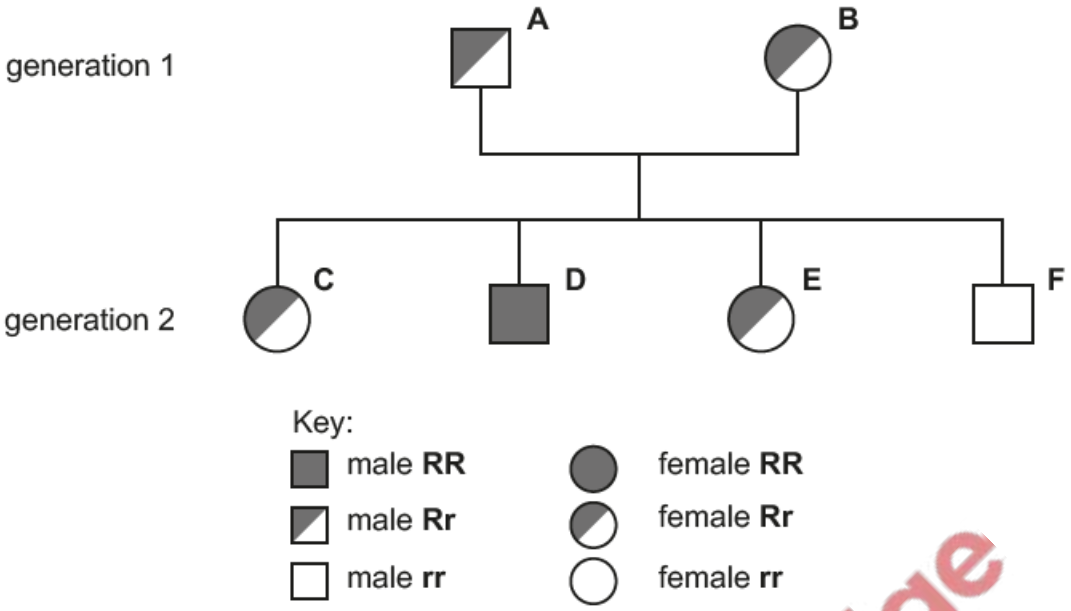


Fig. 3.2

(i) State the total number of guinea pigs with smooth coats in Fig. 3.2.

..... [1]

(ii) State the letter of a guinea pig that has a homozygous dominant genotype in Fig. 3.2.

..... [1]

(iii) State the total number of male guinea pigs in Fig. 3.2.

..... [1]

(c) Two guinea pigs are bred together.

- The genotype of the male guinea pig is **RR**.
- The genotype of the female guinea pig is **Rr**.

Complete Fig. 3.3 to show the:

- possible genotypes of the offspring from this cross
- the probability of offspring having a smooth coat.

		male	
		.....	.....
female	.....	.....	.....
	.....	.....	.....

probability of offspring having a smooth coat .....

Fig. 3.3

[3]

(d) Complete the sentence about breeding.

Two identical homozygous individuals that breed together will be

..... -breeding. [1]

16. June/2022/Paper_ 33/No.7(a_ b)

One type of nuclear division produces genetically identical cells.

(a) State the name and **one** role of the type of nuclear division that produces genetically identical cells.

name .....

role .....

.....

[2]

(b) Fig. 7.1 shows the mass of DNA in a cell undergoing this type of cell division. Two cell divisions complete in this time.

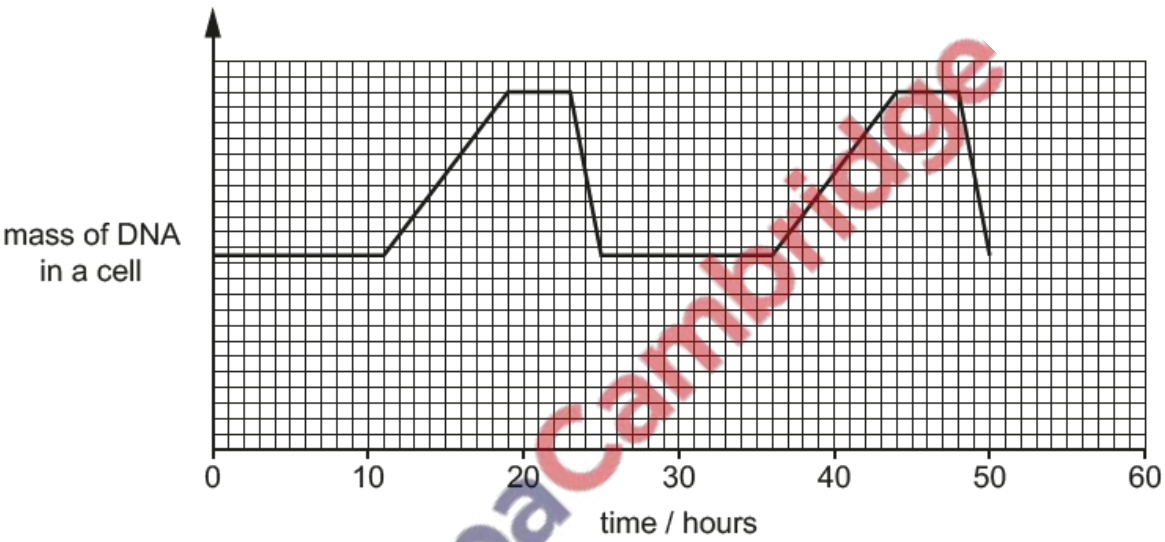


Fig. 7.1

Using the information in Fig. 7.1, calculate how long it takes for the DNA to double in mass.

..... hours [1]

(c) Colour blindness can be caused by a mutation in a gene. The gene is located on the X chromosome.

Fig. 3.3 is a pedigree diagram of a family which has several people who are colour-blind.

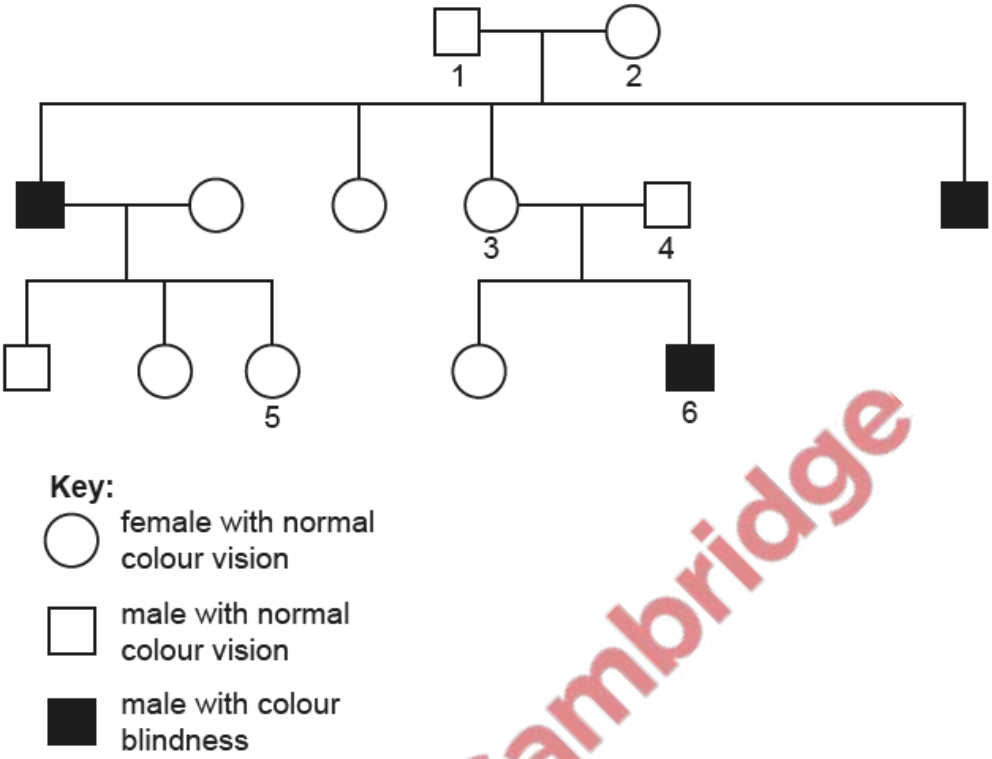


Fig. 3.3

(i) Colour blindness is sex-linked.

State the evidence from Fig. 3.3 that supports the idea that colour blindness is sex-linked.

.....

.....

..... [1]

(ii) State the genotype of person 5.

Use the symbols X and Y for the sex chromosomes and **A** for the dominant allele and **a** for the recessive allele of the gene for colour blindness.

..... [2]

(iii) Use the information in Fig. 3.3 to complete the genetic diagram to show the probability of person **3** and person **4** having another child with colour blindness.

	person **3**		person **4**
parental phenotypes	female with normal colour vision		male with normal colour vision
parental genotypes	.....		.....
gametes	◯ ◯	+	◯ ◯

offspring genotypes .....

offspring phenotypes .....

probability of a child having colour blindness .....

[5]