Inheritance – 2022 November IGCSE 0610 Biology

1. Nov/2022/Paper_12/No.33

In one species of plant, the allele for red-coloured fruit is dominant and is represented by the letter R. The allele for white-coloured fruit is recessive and is represented by the letter r.

Two plants that are heterozygous for fruit colour are crossed.

What are the possible genotypes of the offspring plants from this cross?

A RR, Rr and rr

B all Rr

C all rr

D Rr and rr only

2. Nov/2022/Paper_12/No.35

What can increase the genetic variation in a species?

A growth

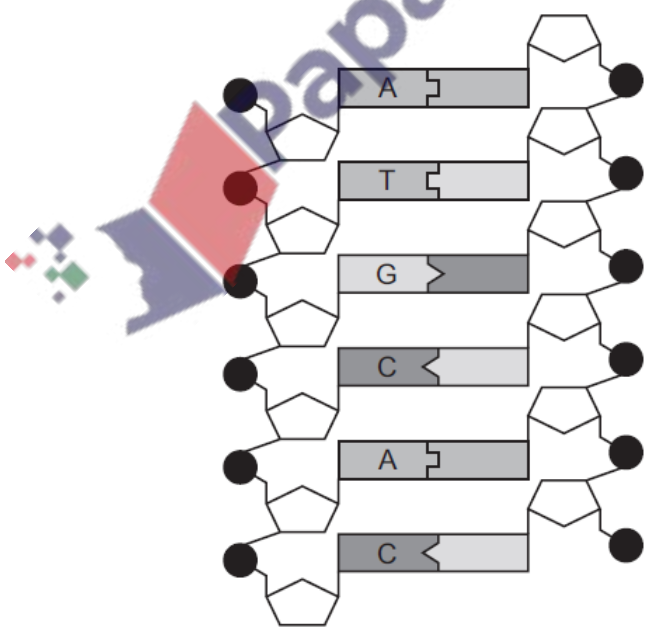
B malnutrition

C mitosis

D mutation

3. Nov/2022/Paper_21/No.7

The diagram shows a length of DNA.

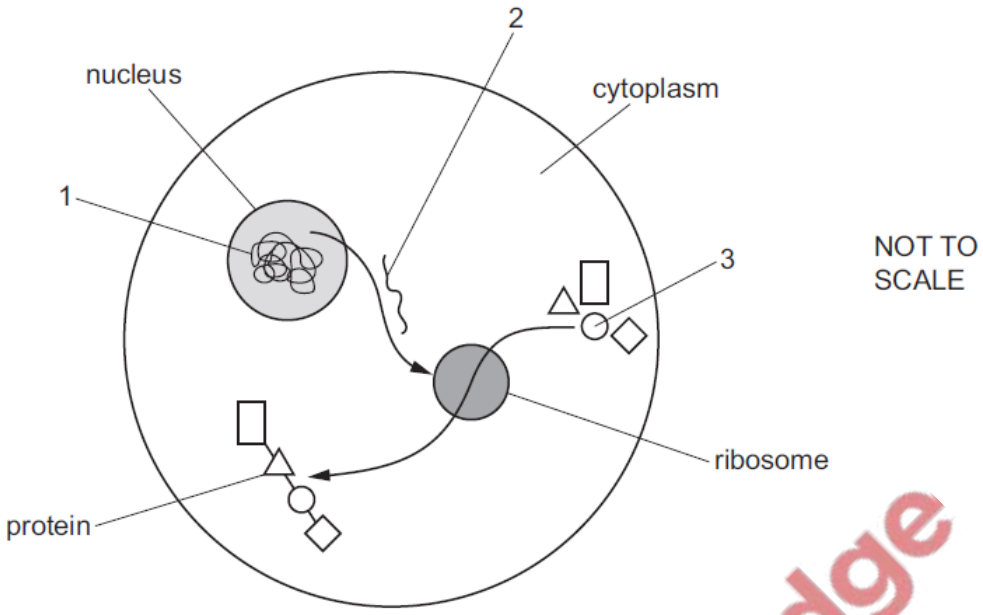


What is the sequence of bases in the unlabelled strand of DNA, starting from the top of the diagram?

A CGTACA **B** TACGTG **C** GCTAGA **D** ATGCAC

4. Nov/2022/Paper_21/No.30

The diagram shows the stages of protein synthesis in a cell.



Which row identifies molecules 1, 2 and 3?

	1	2	3
A	DNA	amino acid	mRNA
B	amino acid	DNA	mRNA
C	DNA	mRNA	amino acid
D	mRNA	DNA	amino acid

5. Nov/2022/Paper_21/No.31

Which description of stem cells is correct?

A unspecialised cells that divide by meiosis to produce daughter cells that may become specialised for specific functions

B specialised cells that divide by mitosis to produce daughter cells that may become further specialised for specific functions

C unspecialised cells that divide by mitosis to produce daughter cells that may become specialised for specific functions

D specialised cells that divide by meiosis to produce daughter cells that may become specialised for specific functions

6. Nov/2022/Paper_21/No.32

In some breeds of cattle, hair colour shows codominance. The coats may be red, white or roan (a mixture of red and white hairs).

What are the expected phenotypes when a parent with a red coat (H^RH^R) is crossed with a parent with a roan coat (H^RH^W)?

A 50% red : 50% roan

B 75% red : 25% roan

C 75% red : 25% white

D 50% red : 50% white

7. Nov/2022/Paper_22/No.7

DNA is a molecule consisting of two linked strands.

Part of a single strand of DNA has the sequence of bases shown.

ACCGTTGAA

What is the sequence of bases in the second strand?

A ACCGTTGAA

B GTTACCAGG

C TGGCAACTT

D CAATGGTCC

8. Nov/2022/Paper_22/No.30

What happens to the number of chromosomes when a cell divides by meiosis?

A doubles from diploid to haploid

B doubles from haploid to diploid

C halves from diploid to haploid

D halves from haploid to diploid

9. Nov/2022/Paper_22/No.31

A sex-linked condition is caused by a recessive allele. A healthy male and female are both unaffected by the condition but the female has one copy of the recessive allele.

What is the chance of their offspring being affected by the sex-linked condition?

A 50% of all their offspring

B 100% of male offspring and 0% of female offspring

C 25% of all their offspring

D 50% of male offspring and 25% of female offspring

10. Nov/2022/Paper_22/No.32

The diagram shows the unspecialised cells of a mammalian embryo soon after fertilisation.

What is the correct description of these cells?

A embryo cells undergoing meiosis

B gametes undergoing mitosis

C stem cells undergoing mitosis

D zygote undergoing meiosis

11. Nov/2022/Paper_23/No.8

Which statement about the structure of DNA is correct?

A DNA contains six types of base.

B DNA contains three strands coiled to form a helix.

C DNA is made of a chain of amino acids.

D DNA has two strands with cross-links between pairs of bases.

12. Nov/2022/Paper_23/No.32

The diagram shows the unspecialised cells of a mammalian embryo soon after fertilisation.

What is the correct description of these cells?

A embryo cells undergoing meiosis

B gametes undergoing mitosis

C stem cells undergoing mitosis

D zygote undergoing meiosis

13. Nov/2022/Paper_31/No.2

(a) Inheritance is the transmission of genetic information from generation to generation.

The boxes on the left show some of the terms used when describing inheritance.

The boxes on the right show definitions for these terms.

Draw **four** straight lines to link each term with its definition.

term	definition
	an allele that is expressed if it is present
dominant	
	genetic make-up of an organism
genotype	
	having two different alleles of a particular gene
heterozygous	
	having two identical alleles of a particular gene
phenotype	
	observable features of an organism

[4]

(b) The three structures listed are found inside cells.

allele **chromosome** **nucleus**

List these **three** components in order of size starting with the smallest.

..... smallest

.....

.....

largest

[1]

(c) Table 2.1 contains statements about mitosis and meiosis.

Complete Table 2.1 by placing ticks (✓) in the boxes to show the correct statements about mitosis and meiosis.

Table 2.1

statement	mitosis	meiosis
a type of nuclear division		
gives rise to genetically different cells		
important for the repair of damaged tissues		
needed for growth		
produces gametes		
used in asexual reproduction		

[6]

[Total: 11]

14. Nov/2022/Paper_33/No.2

(a) Fig. 2.1 shows a diagram of an animal cell.

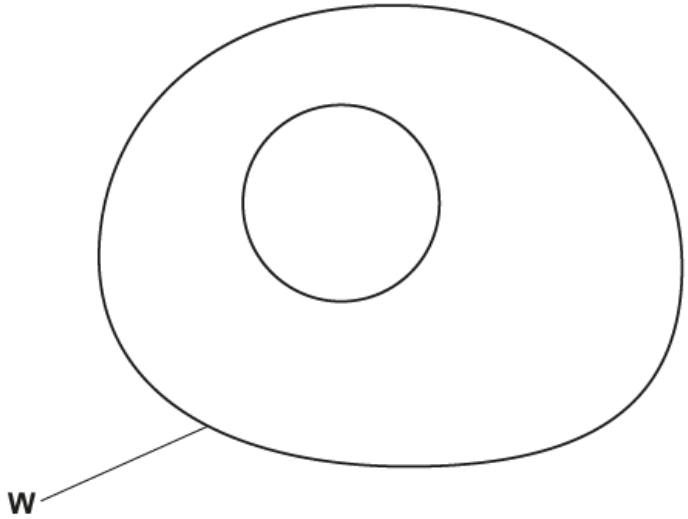


Fig. 2.1

(i) State the name of structure **W** on Fig. 2.1.

..... [1]

(ii) Write the letter **X** on Fig. 2.1 to show where chromosomes are found.

[1]

(iii) State what chromosomes are made from.

..... [1]

(b) **(i)** State the sex chromosomes that are found in the body cells of a human male.

..... [1]

(ii) A man and a woman have a child.

Complete the genetic diagram to show the inheritance of sex.

State the probability of the child being female.

		father	
mother			

probability of the child being female .....

[3]

[Total: 7]

15. Nov/2022/Paper_41/No.4

Chromosomes are made of DNA.

(a) Describe the structure of a DNA molecule.

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..... [4]

(b) **(i)** Outline how antibiotic resistance develops in a population of bacteria.

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..... [3]

(ii) Scientists use differences in antibiotic-resistance genes to distinguish between different strains of the bacterium, methicillin-resistant *S. aureus* (MRSA).

Suggest why scientists use differences in base sequences to classify the strains of MRSA rather than using other methods.

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..... [1]

(iii) Explain why scientists are concerned that some strains of bacteria, such as *S. aureus*, have become resistant to antibiotics.

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..... [2]

(c) (i) Describe how the use of antibiotics can be managed to reduce the development of resistant strains of bacteria.

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..... [2]

(ii) Suggest why MRSA is unlikely to be transmitted from a mother to her unborn fetus.

.....

.....

..... [1]

(d) Many species of bacteria do not cause disease. Bacteria are very important in many biological processes.

State the names of **three** natural processes involving bacteria that are important to ecosystems.

1 .....

2 .....

3 .....

[3]

[Total: 16]