

1. Nov/2020/Paper_11/No.37

In a species of mouse, fur colour can be black or white. Two black female mice were allowed to mate with the same black male. One female had nine young, all of which were black. The other female had seven young, five black and two white.

One of these white mice was male, and is allowed to mate with a heterozygous female.

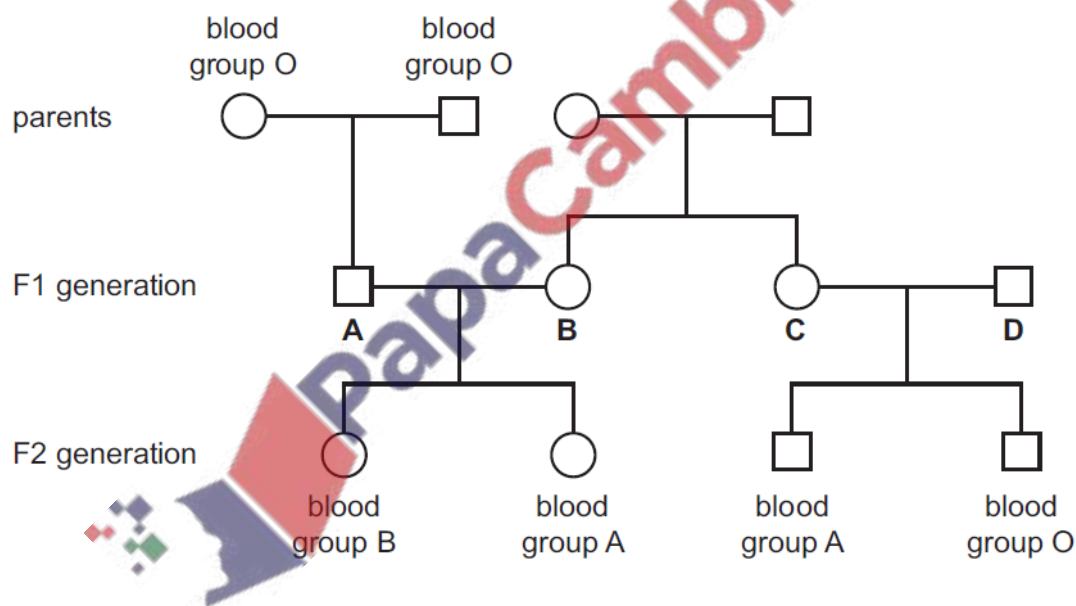
What is the expected ratio of phenotypes of their offspring?

- A** 1 black : 1 white
- B** 1 black : 3 white
- C** 1 black : 2 grey : 1 white
- D** 3 black : 1 white

2. Nov/2020/Paper_11/No.38

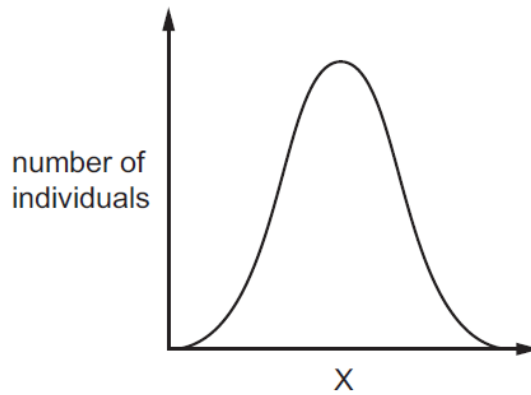
The diagram shows the blood group phenotypes of some members of a family.

Which member of the F1 generation must be heterozygous with the codominant alleles?



3. Nov/2020/Paper_11/No.39

The diagram shows the distribution of a human characteristic, X, in the population.



What is the characteristic X?

- A blood group
- B eye colour
- C height
- D sex

4. Nov/2020/Paper_12/No.37

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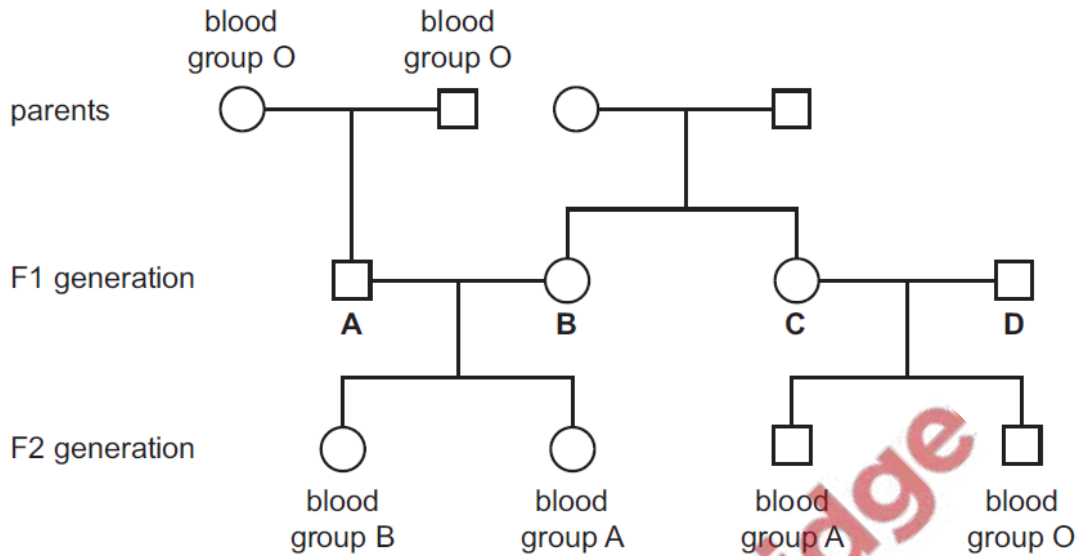
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5. Nov/2020/Paper_12/No.38

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6. Nov/2020/Paper_12/No.39

Which human characteristic shows discontinuous variation?

- A body mass
- B heart rate
- C height
- D sickle cell anaemia

7. Nov/2020/Paper_12/No.40

A farmer wants to produce extra-large, sweet oranges, by selective breeding.

Using information from the table, which plant types should the farmer select for breeding?

plant type	size of orange / cm			percentage sugar content	
	6–9	9–12	12–15	10	20
1		x		x	
2			x	x	
3	x				x
4		x			x
5	x			x	

- A 1 and 2
- B 1 and 3
- C 2 and 4
- D 4 and 5

(a) Describe, with examples, what is meant by the term *mutation*. Name factors which may increase the rate of mutation.

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(b) Artificial Insemination is a method of breeding farm animals in which the semen (liquid containing sperm) from a selected male animal is sent to a farmer to fertilise females of the same species.

Suggest possible advantages of this method over natural methods of breeding farm animals.

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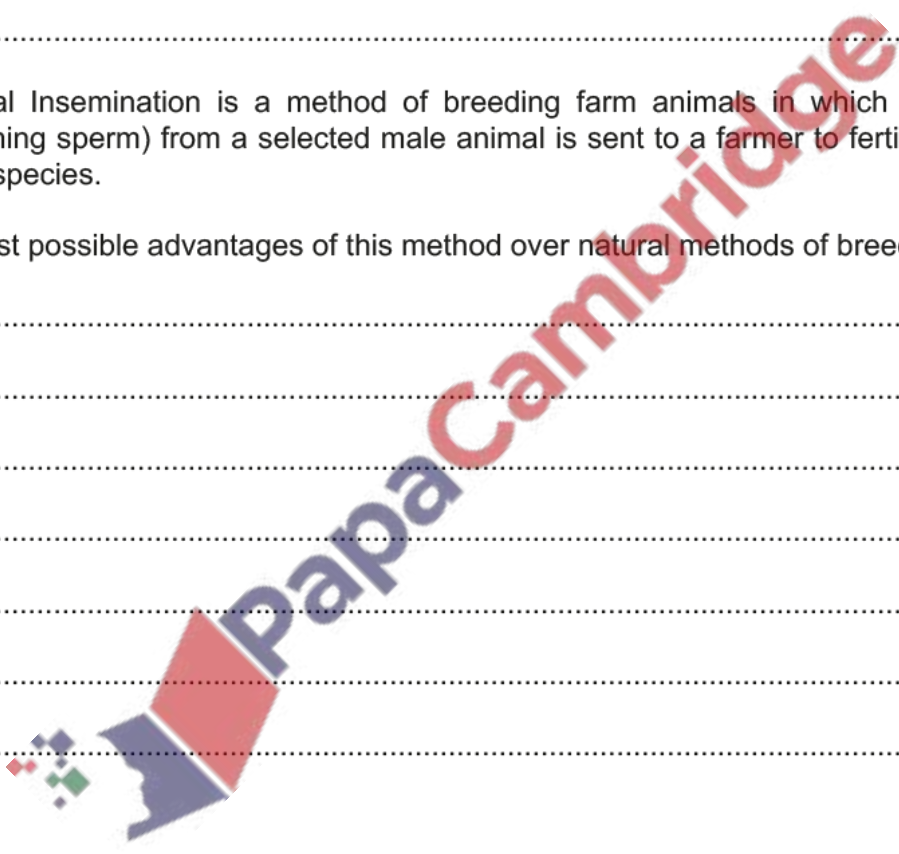
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[Total: 10]



9. Jun/2020/Paper_11/No.37

Natural selection plays a role in evolution.

What describes features of natural selection that can affect evolution?

	better adapted individuals have a greater chance of surviving and breeding	survivors may transfer an advantageous feature to their offspring
A	no	no
B	no	yes
C	yes	no
D	yes	yes

10. Jun/2020/Paper_11/No.38

In guinea-pigs, the allele for black fur (B) is dominant to the allele for brown fur (b). A breeder can sell a brown guinea-pig for more money than a black guinea-pig.

Which cross will produce the most money?

- A** BB × BB **B** BB × Bb **C** Bb × Bb **D** Bb × bb

11. Jun/2020/Paper_11/No.39

The inheritance of the ABO blood groups in humans is controlled by three alleles (I^A , I^B and I^O), only two of which can be present in one individual.

What are the possible blood groups of children born to a homozygous group A woman and a heterozygous group B man?

- A** AB and B only
B AB and A only
C A, B and AB only
D A, B, AB and O

12. Jun/2020/Paper_12/No.37

What describes features of natural selection?

	causes mutations to happen	leads to the evolution of new species	results in existing species becoming extinct
A	yes	yes	yes
B	yes	yes	no
C	yes	no	yes
D	no	yes	yes

13. Jun/2020/Paper_12/No.38

A farmer uses sperm from a black male sheep to artificially inseminate (fertilise) 20 light brown female sheep.

All of the offspring produced were black.

Which statement explains these results?

- A** The alleles for light brown colour are dominant.
- B** The male sheep is heterozygous and the allele for black colour is dominant.
- C** The male sheep is homozygous and the allele for black colour is codominant.
- D** The male sheep is homozygous and the allele for black colour is dominant.

14. Jun/2020/Paper_12/No.39

The inheritance of the ABO blood groups in humans is controlled by three alleles (I^A , I^B and I^O), only two of which can be present in one individual.

What are the possible blood groups of children born to a homozygous group A woman and a heterozygous group B man?

- A** AB and B only
- B** AB and A only
- C** A, B and AB only
- D** A, B, AB and O

15. Jun/2020/Paper_12/No.40

Which statement is **always** true of dominant alleles?

- A They cannot undergo mutation.
- B They give a greater chance of survival than recessive alleles.
- C They give the same phenotype in heterozygotes and homozygotes.
- D They occur less frequently in the population than recessive alleles.

16. Jun/2020/Paper_21/No.5

- (a) The passage describes the nucleus of a cell with missing words replaced by the letters **J**, **K**, **L** and **M**. Read the passage, then select words from the list below the passage to replace letters **J**, **K**, **L** and **M**.

In the nucleus of a body cell from a person with Down's syndrome, there are **J** thread-like structures called **K**. These are made up of many units called **L** that instruct the cell to produce a particular **M**.

carbohydrate

chromosomes

DNA

fat

forty-seven

genes

protein

twenty-four

twenty-three

J

K

L

M

[4]

- (b) When suddenly exposed to bright light, some people automatically sneeze. This is known as the photic sneeze reflex.

The photic sneeze reflex is the result of the possession of a dominant allele **A**. Use a genetic diagram to show how parents, both with the photic sneeze reflex, can have a child who is **not** affected by the photic sneeze reflex.

[3]

[Total: 7]

(b) Name the type of gamete produced by a human male.

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Outline the process for producing this type of gamete.

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[5]

[Total: 10]

