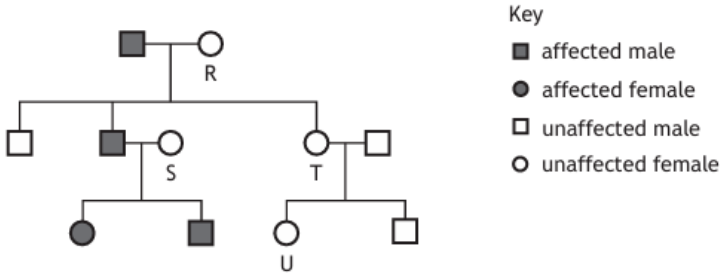
Sex Determination Past Papers

1. Red-green colour deficiency is a sex-linked condition caused by a recessive allele.

The diagram shows the inheritance of this condition in a family.



Using the information given in the diagram, which of the females **must** be carriers of red-green colour deficiency?

A S only
B R and S only
C R, S and T only
D R, S, T and U

2. Which of the following is a correct statement about X chromosome inactivation?

A It is the cause of the Y chromosome being genetically inactive.
B In females, it prevents the expression of harmful alleles present on the X chromosome.
C The X chromosome inherited from the mother is active in all female cells.
D It ensures the amount of protein encoded by X chromosomes in females is approximately equal to that of males.

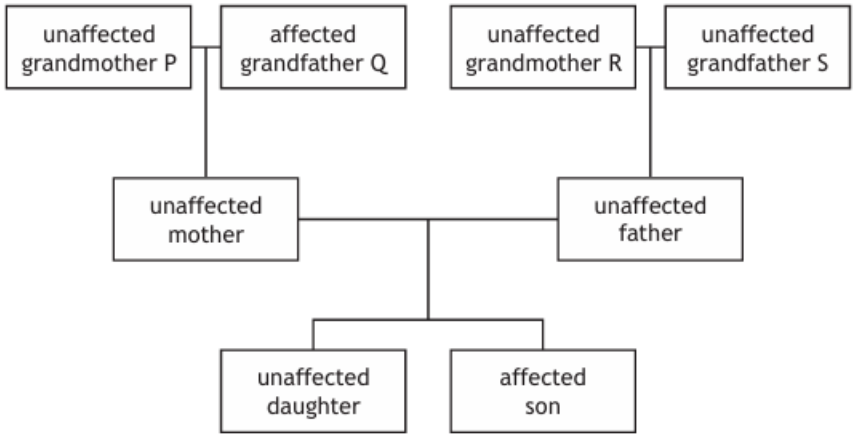
3. *Bent-tail* is an inherited condition in mice that causes them to have short, crooked tails. The gene responsible is sex-linked, and the allele for bent-tail (X^B) is dominant to the allele for normal tail (X^b).

If a male mouse with bent-tail is crossed with a heterozygous female mouse, the expected proportion of female mice with normal tails would be

A 0.0
B 0.25
C 0.5
D 0.75

4. Haemophilia A is a sex-linked condition that slows blood clotting. The allele for normal clotting (X^H) is dominant to the allele for haemophilia A (X^h).

The diagram gives information about the inheritance of haemophilia A in one family.



From the information given, which of the statements is true?

A The genotype of grandmother P must be X^HX^h but the genotype of grandmother R cannot be determined.
B The genotype of neither grandmother can be determined.
C The genotype of both the unaffected mother and her daughter must be X^HX^h.
D The genotype of neither the mother or her daughter can be determined.

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5. In the fruit fly *Drosophila melanogaster* the gene for eye colour is sex-linked. The allele for red eye (R) is dominant to the allele for white eye (r).

A cross between two flies produced the offspring shown in the table below.

Sex of offspring	*Number with white eyes*	*Number with red eyes*
female	23	22
male	21	22

The genotypes of the parents in this cross were

A X^rX^r and X^RY

B X^RX^r and X^rY

C X^RX^r and X^RY

D X^RX^R and X^rY.

6. In mammals, some genes are present on the Y chromosome but not on the X chromosome. An allele of one such gene causes deafness.

What is the chance of a male with deafness caused in this way having a child who inherits his condition?

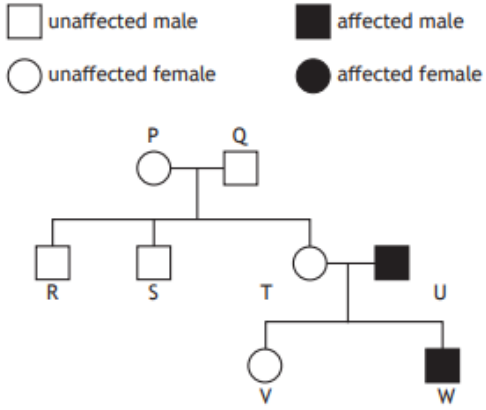
A 0%

B 25%

C 50%

D 100%

7. Red-green colour deficiency is X-linked. The diagram below shows a family tree in which this condition occurs.



Which of the following individuals passed on the allele responsible for red-green colour deficiency in individual W?

A T only

B U only

C T and U

D T and P

8. In birds, **females** are heterogametic. The gene for feather-barring in chickens is sex-linked and the allele for barred feathers is dominant to the allele for non-barred feathers.

What ratio of offspring would be expected when a non-barred male is crossed with a barred female?

A 1 barred male : 1 non-barred female

B 1 non-barred male : 1 non-barred female

C 1 barred female : 1 barred male

D 1 non-barred male : 1 barred female

Sex Determination Past Paper Answers

1. C
2. D
3. C
4. C
5. C
6. A
7. C
8. D