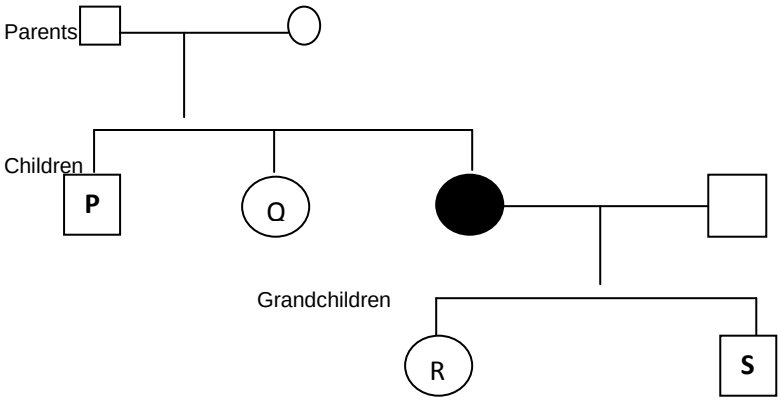
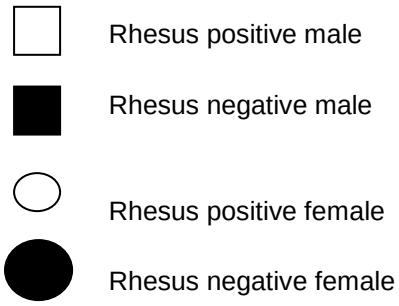
1. The family tree below shows the transmission of the Rhesus D-antigen through three generations of a family. The allele coding for the presence of the Rhesus D-antigen is dominant and autosomal.





Which of the children and grandchildren in the family tree must be heterozygous?

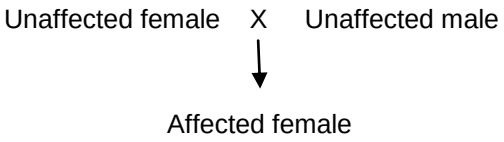
A P, Q, R and S

B P and Q only

C R and S only

D Q and R only

2. The family tree shows the pattern of inheritance of a genetic condition.



The allele responsible for this condition is both

A sex –linked and recessive

B sex – linked and dominant

C autosomal and recessive

D autosomal and dominant

3. Haemophilia is a sex-linked recessive condition. A woman, who does not have this condition, has a haemophiliac son. The boy's father is also a haemophiliac.

What are the genotypes of the parents?

	Father	Mother
A	X^HY	X^HX^h
B	X^hY	X^hX^h
C	X^hY	X^HX^H
D	X^hY	X^HX^h

4. Cystic fibrosis is a genetic condition caused by an allele which is not sex-linked.

A child is born with cystic fibrosis despite neither parent having the condition.

The parents are going to have a second child. What is the chance this child will have cystic fibrosis?

A. 1 in 2 **B.** 1 in 3 **C.** 1 in 4 **D.** None

5. Huntington's Disease is an inherited condition in humans caused by a dominant allele which is not sex-linked.

A woman's father is heterozygous for the condition and her mother is unaffected.

What is the chance of the woman having the condition?

A 1 in 1

B 1 in 2

C 1 in 3

D 1 in 4

6. A sex-linked condition in humans is caused by a recessive allele. What is the chance of an unaffected man and a carrier woman having an unaffected male child?

A 1 in 1
B 1 in 2
C 1 in 3
D 1 in 4

7. The table below shows some genotypes and phenotypes associated with a form of anaemia

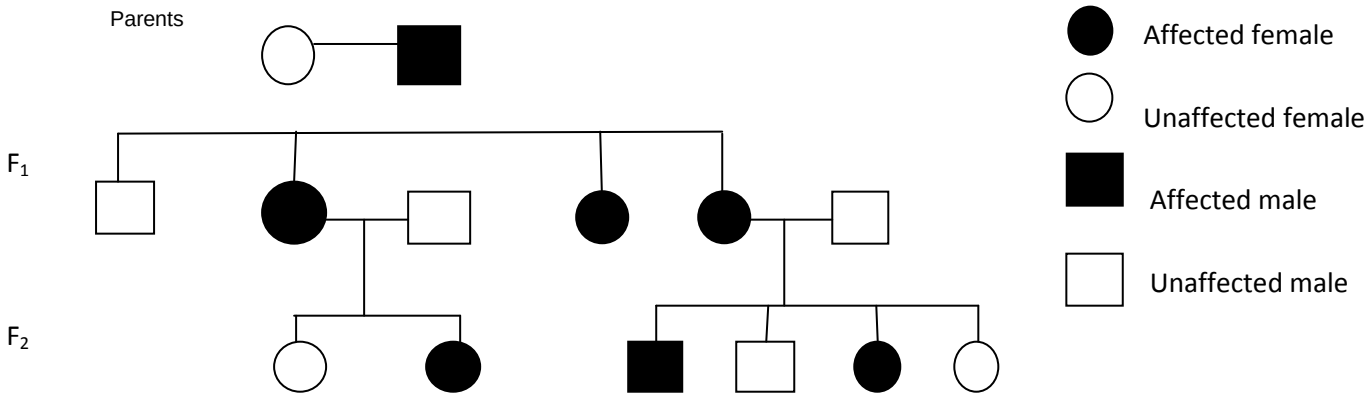
Genotype	*Phenotype*
AA	Unaffected
AS	Sickle cell trait
SS	Acute sickle cell anaemia

An unaffected person and someone with sickle cell trait have a child together.

What are the chances of the child having acute sickle cell anaemia?

A none
B 1 in 4
C 1 in 2
D 1 in 1

8. The family tree shows the inheritance of a bone disorder.



The disorder is caused by a dominant sex-linked allele (**B**).

(a) Using appropriate symbols, give the genotypes of individuals **P, Q, R, S.**

P _____ **Q** _____ **R** _____ **S** _____ **2**

(b) (i) Explain why all the F_1 females in this family are affected.

_____

_____

_____ **1**

(ii) Explain why only some of the F_2 females in this family are affected.

_____

_____

_____ **1**

(c) Is the ratio of affected offspring to unaffected offspring in the F_1 generation as expected? Give a reason for your answer.

Yes/No _____

Reason _____

_____ **1**