Inheritance

Total marks : 21

Q1.

Haemochromatosis is a disease that occurs when iron accumulates in the liver.

A person with haemochromatosis is treated by having 0.5 dm^3 of their blood removed each week.

This lowers the level of iron in their blood.

(i) Give **two** safety precautions needed when blood is removed from this person.

(2)

1 .....

.....

2 .....

.....

(ii) Haemochromatosis can be inherited.

Haemochromatosis occurs when a person inherits two copies of a recessive allele.
Figure 9 shows the inheritance of haemochromatosis in a family.

Figure 9

State and explain the genotype of female Z.

(3)

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(Total for question = 5 marks)

Q2.

Duchenne muscular dystrophy is a recessive sex-linked genetic disorder. This disorder causes muscle weakness.

Figure 14 shows the inheritance of Duchenne muscular dystrophy in a family.

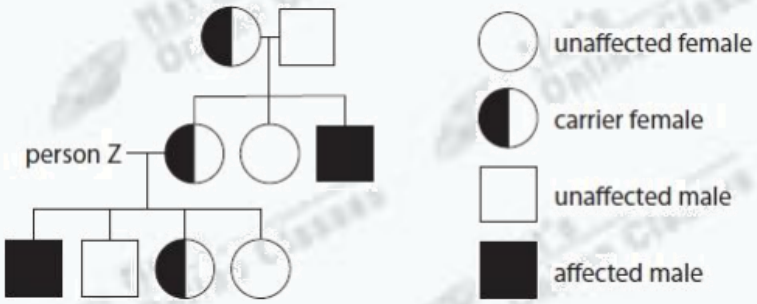

Figure 14

State and explain the phenotype of person Z.

(3)

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(Total for question = 3 marks)

Q3.

Huntington's disease is a genetic disorder.
Huntington's disease is caused by a dominant allele (H).

Figure 6 shows the inheritance of Huntington's disease in a family.

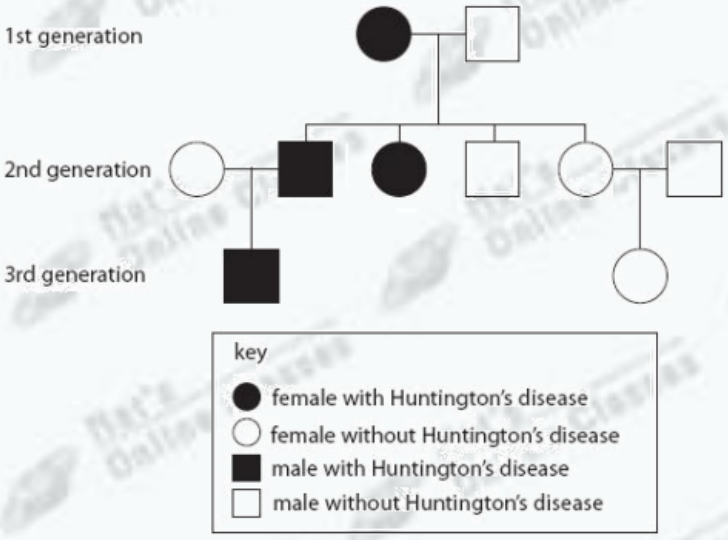

Figure 6

(i) State the genotype of the male in the 1st generation.

(1)

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(ii) It is possible for a female with Huntington's disease to have one of two genotypes.
State the two genotypes possible for a female with Huntington's disease.

(2)

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(iii) Explain which Huntington's disease genotype the female in the 1st generation must be.

(3)

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(Total for question = 6 marks)

Q4.

The DNA of an organism determines its phenotype.

White tigers are produced because of a mutation of a single allele which usually produces the normal orange and yellow fur pigmentation.

The mutated allele is recessive.

Samba, a male white tiger, was bred with Rani. They had three offspring; two offspring have white fur and one has a normal fur pigmentation.

(i) State the genotype of Rani.

(1)

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.....

(ii) The offspring with normal fur pigmentation was bred with a tiger that was heterozygous.

Use A/a to represent the alleles for fur pigmentation.
Predict, using the Punnett square, the percentage probability of the offspring from this cross having normal fur pigmentation.

(2)

percentage probability = ... %

(Total for question = 3 marks)

Q5.

Sickle cell disease is a recessive genetic disorder in humans.

(i) Two parents are heterozygous for sickle cell disease.

Complete the Punnett square to show the possible genotypes of their children.

(1)

	D	d
D		
d		

(ii) State the percentage probability that their children could have sickle cell disease.

(1)

percentage probability = ... %

(iii) A father with the genotype dd and a mother with the genotype DD plan to have several children.

Explain why none of their children will have sickle cell disease.

(2)

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(Total for question = 4 marks)