

3.3 Inheritance

Question Paper

Course	DP IB Biology
Section	3. Genetics
Topic	3.3 Inheritance
Difficulty	Hard

Time allowed: 10
Score: /5
Percentage: /100

Question 1

Which rows correctly describe monohybrid crosses that follow Mendel's principles of inheritance?

	Cross	Predicted outcome
I	A pure-breeding parent with dominant alleles is crossed with a pure-breeding parent with recessive alleles.	All of the offspring will have the same characteristic as the dominant parent
II	A plant which is heterozygous dominant for a trait is crossed with a plant that is homozygous recessive.	Equal 1:1 ratio of offspring with either phenotype exhibited by the parent.
III	Pure breeding parents that have co-dominant alleles are crossed.	Equal proportions of offspring with a characteristic of either of the parents.
IV	Two parents that are heterozygous dominant are crossed	Three times as many offspring have the dominant phenotype (3:1 ratio).

- A. I and II only.
- B. I, II and IV.
- C. I and IV only.
- D. II, III and IV.

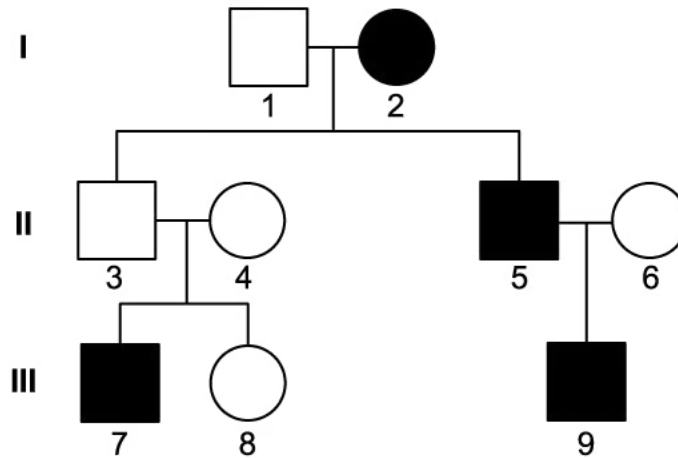
[1 mark]

Question 2

The pedigree chart below shows the inheritance of Tay-Sachs disease which is an autosomal recessive trait, characterised by neurological problems caused by the death of nerve cells.

In the pedigree chart, a filled in circle or square means the individual is affected and shows the genetic condition.

What is the probability that individuals 3 and 4 will have another child with Tay-Sachs disease?



- A. 25%
- B. 50%
- C. 75%
- D. 100%

[1 mark]

Question 3

Which statements best explain why the ABO blood system in humans is an example of co-dominance?

- I. Allele I^A and the allele I^B are both expressed in the heterozygote/AB type blood.
- II. Neither allele I^A or the allele I^B can mask the expression of the other allele.
- III. There are three alleles of the gene that controls the blood group.
- IV. There are more than two blood groups.

- A. All of them.
- B. I, II, and III.
- C. I, and II.
- D. II, and III.

[1 mark]

Question 4

Two parents with normal factor VIII have a child with haemophilia.

Which is the correct statement?

- A. The mother is normal but the father carries the defective gene.
- B. Both parents are carriers for the defective gene.
- C. Only the mother is a carrier for the defective gene.
- D. The child must have been female.

[1 mark]

Question 5

Which statements best explain why a significant increase in the incidence of cancer was reported following the nuclear bombing of Hiroshima and Nagasaki, and the nuclear accident of Chernobyl?

- I. Ionising radiation can induce breaks in the DNA structure.
- II. Control of the cell cycle can be affected by mutagens.
- III. Mutations were passed down to offspring leading to increased cancer rates.
- IV. Mutations arise when the body repairs a break in the DNA structure.

- A. I, II and III.
- B. I, II, and IV.
- C. I, III and IV.
- D. I, II, III and IV.

[1 mark]