



Q1/ In mice, black coat color (B) is dominant over brown (b), and a solid pattern (S) is dominant over white spotted (s). Color and spotting are controlled by genes that assort independently. A homozygous black, spotted mouse is crossed with a homozygous brown, solid mouse. A testcross is then carried out by mating the F1 mice with brown, spotted mice.

A) Give the phenotypes and genotypes of the parents and the F1 mice? (20 Marks)

B) Give the genotypes and phenotypes, along with their expected ratios, of the progeny expected from the testcross?

(20 Marks)

Q2/ A) Explain the **Medical genetics** with **heredity and Inheritance** and write the main subject matter of genetics?

B) Enumerate the essential elements of **functional chromosome** and how could you classify the chromosomes?

(20 Marks)

Q3/ A) How many gametes will be produced for the following **allele arrangements**, giving formula?

1. IiBBXxZzVVWwHhYy. 2. RrYySs. 3. DdEeTtMMGgKk. 4. MmNnOoPPQQRrssTtFfLl.
5. AaGgCCDdTt.

B) What is the meaning of "**model genetic organism**," giving ten examples of **model organisms**?

Can you also think of some reasons why zebrafish is an important model in genetic studies?

Q4/ Give the Reasons of the followings:

(20 Marks)

1. The horse would not make a good **model genetic organism**.
2. **Mendel** had selected *Pisum sativum* for his experiment.
3. For **studying human chromosomes**, mitotic chromosomes are fairly easy while meiotic chromosomes are much more difficult.
4. From an evolutionary perspective, there are three major groups of organisms: bacteria, archaea, and eukaryotes.

Q5/ A) Briefly compare the followings:

(20 Marks)

1. Genotype and Phenotype.
2. Mendel's first Law and Mendel's second Law.

B) Mention the Summarization and proposed of early concepts of Heredity.

Good Luck

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