**University of Salahaddin**
**College of Science**
**Biology Department**
**1st Trial**

**Medical Genetics – Theory**
**2nd Stage**
**Time: 2 hours**
**0 /0/2024**

**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**

**Dr. Mukhlis H. Aali**

**Lecturer**