# RAMAKRISHNA MISSION VIDYAMANDIRA

**(Residential Autonomous College affiliated to University of Calcutta)**

**B.A./B.Sc. FIRST SEMESTER EXAMINATION, MARCH 2022**

**FIRST YEAR [BATCH 2021-24]**

Date : 10/03/2022

Time : 11 am – 1 pm

**ZOOLOGY (HONOURS)**

**PAPER : II [CC2]**

Full Marks : 50

**Answer all the questions:**

## Group A

1. a) What are the differences between induced and spontaneous mutations?

   b) How the reverse and suppressor mutations are capable of altering the impact of a mutation? (2.5+2.5)

2. a) Mention DNA repair mechanisms that a cell can use to overcome a point mutation.

   b) Justify why translocation mutation cannot be repaired. (3+2)

3. a) How chromosomal aberrations can influence the organism?

   b) What is the significance of ClB method of mutation detection? (2.5+2.5)

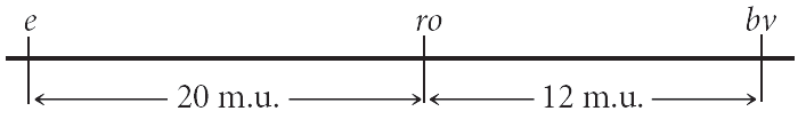
## Group B

4. a) Mention the assumptions of Hardy-Weinberg equilibrium.

   b) What are Genetic Drift, Founder effect and Population bottleneck? (2+3)

5. a) What is crossing-over? In which stage of cell cycle does it happen?

   b) Ebony body colour (*e*), rough eyes (*ro*), and brevis bristles (*bv*) are three recessive mutations that occur in fruit flies. The loci for these mutations have been mapped and are separated by the following map distances:




   The interference between these genes is 0.4. A fly with ebony body, rough eyes, and brevis bristles is crossed with a fly that is homozygous for the wild-type traits. The resulting F1 females are test-crossed with males that have ebony body, rough eyes, and brevis bristles; 1800 progeny are produced. Give the expected numbers of phenotypes in the progeny. (2+3)

6. a) Full colour (D) in domestic cats is dominant over dilute colour (d). Of 325 cats observed, 194 have full colour and 131 have dilute colour. If this population of cats is in Hardy–Weinberg equilibrium for the dilution locus, what is the frequency of the dilute (d) allele?

   b) How many of the 194 cats with full colour are likely to be heterozygous? What is the principle of somatic cell hybridization to map genes to their respective chromosomes? (3+2)

## Group C

7. a) Why human ABO blood grouping system is known as a multiple allele system?

   b) Why male fruit fly is SXL negative while female is SXL positive?

   c) Define incomplete dominance. (2+2+1)

8. a) How XXX female and Y0 male could be produced in *Drosophila*?

   b) A red flower (dominant) is crossed with white (recessive) producing 2red:1purple:1white red spotted. Identify Mendellian and non-Mendellian traits with justification.

   c) What does roX1 & roX2 do in the process of dosage compensation of *Drosophila*? (2+2+1)

9. a) How does sex is being defined in human referencing to the successive modifications of bipotential gonad?

   b) Being an extra-chromosomal in nature, how does kappa positive character is passed from one *Paramoecium* to another with special reference to conjugation length duration?

   c) How epigenetical process is different from mutation? (2+2+1)

10. a) Differentiate between DNA, gene, genotype and trait.

    b) How does Tsix play a crucial role in human dosage compensation?

    c) Define Bombay Phenotype. (2+2+1)

———— × ————