Principles of Genetics (AGB 2102)

Answer ALL Questions
Time Allowed : 03 Hours

1. Briefly discuss the following

   a) Cell cycle

   b) Prophase I of meiosis

   c) Chromosomal translocation

2. Explain

   a) Co-dominance

   b) Incomplete dominance

   c) Chi-square test of significance

3. a) Define the term "Euploidy".

   b) Describe the different types of euploidy that are commonly encountered in nature.

   c). Why are polyploids considered important?

4. a) Explain the concept of multiple genes for quantitative inheritance with a suitable example.

   b) What are the special features of polygenic traits?

5. a). Describe a "Mendelian Population".

   b). What are the requirements for a populations to remain at genetic equilibrium.

   c). Consider a hypothetical case of two alleles "*A*" and "*a*" in a population at genetic equilibrium, which had 1480 *AA*. 1240 *Aa* and 280 *aa* genotypes. Using these values demonstrate that random mating will maintain genetic equilibrium.

6. a). What are the aspects to be considered in genetic mapping?

b). What is meant by "Interference and Coincidence".

c). A kidney bean shaped eye is produced by a recessive gene k on the third chromosome of *Drosophila*. Orange eye colour, called "cardinal" is produced by the recessive gene cd on the same chromosome. Between these two loci is a third locus with a recessive allele e producing ebony body colour. Homozygous kidney, cardinal females are mated to homozygous ebony males. The trihybrid F_1 females are then test crossed to produce the F_2. Among 4000 F_2 progeny are the following:

1761 kidney, cardinal	97 kidney
1773 ebony	89 ebony, cardinal
128 kidney, ebony	6 kidney, ebony, cardinal
138 cardinal	8 wild type.

a) Determine the linkage relationships in the parents and F_1 trihybrids.

b) Estimate the map distances.