(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 9 Sub. Code : 1 3 8 2 1

Exam. Code : 5 0 5 2

**B.Sc. (Hons.) (Bio-Technology) FYUP 2nd Semester**

**(2055)**

**GENETICS**

**Paper–BIOT201**

**Time Allowed : Three Hours]** **[Maximum Marks : 68**

**Note :—** Attempt **FIVE** questions in all. Question No. **1** is compulsory. Attempt **ONE** question each from each Unit.

1. Short answer type :

   (a) Differentiate between incomplete dominance, codominance, and multiple alleles.

   (b) Define linkage. Enlist its various types.

   (c) What is Three point test cross ?

   (d) Write a short note on position effect.

   (e) Define gene and allele frequency. Give the mathematical formula to calculate them.

   (f) Explain coincidence. 2×6

## UNIT—I

2. (a) Describe Mendel's law of independent assortment with the help of suitable examples.

   (b) Explain the inheritance pattern of X-linked dominant traits. Discuss why X-linked dominant disorders can affect both males and females, but the severity might differ between both the sexes. 7,7

3. (a) Explain with the help of examples, how extrachromosomal inheritance contributes to genetic diversity.

   (b) Explain the concept of chromosomal theory of inheritance. 7,7

## UNIT—II

4. (a) Explain with the help of a suitable diagram molecular mechanism for recombination.

   (b) Write note on :

   (i) Crossing over

   (ii) Interference. 7,7

5. Explain the different types of structural chromosomal aberrations. How do these affect gene expression and the overall phenotype of an organism ? 14

## UNIT—III

6. (a) Define mutations. Discuss with a suitable example the mechanism of mis-sense, non-sense and silent mutations.

   (b) Explain the mechanism of direct DNA repair in detail. 7,7

7. What are Chromosomal Aberrations ? Differentiate between polyploidy and aneuploidy as numerical chromosomal aberrations. 14

## UNIT—IV

8. Explain the Hardy-Weinberg equilibrium principle in detail. Discuss the five main assumptions that must be met for a population to be in Hardy-Weinberg equilibrium. 14

9. (a) How mutations can be analyzed in a biochemical pathway ? Explain.

   (b) Write note on one gene-one enzyme hypothesis. 7,7