November 2025
M.Sc.
Third Semester
CORE – 09
BOTANY
Course Code: MBOC 3.11
(Genetics, Cytogenetics & Plant Breeding)

Total Mark: 70 *Pass Mark: 28*
Time: 3 hours

Answer five *questions, taking* one *from each unit.*

UNIT–I

1. Describe in detail Mendel's monohybrid experiment. Explain the different principles deduced from this experiment. 7+7=14

2. (a) When two white flowered sweet pea plants were crossed, the F_1 flower colour was purple and on selfing the F_2 segregated into purple and white flowered types only (9:7 ratio). Elucidate this phenomenon. 7
   (b) Explain the phenomenon of incomplete dominance with a suitable example. 7

UNIT–II

3. Discuss in detail the different types of structural aberrations. 14

4. (a) Write a brief note on allopolyploidy citing suitable examples. 7
   (b) What is aneuploidy? Briefly describe the different types of aneuploidy. 2+5=7

UNIT–III

5. Write a note on each of the following: 7×2=14
   (a) Origin of haploids
   (b) Synthesis of hexaploid triticales

6. Give an account of the origin and meiotic behaviour of autopolyploids. 14

UNIT–IV

7. State the Hardy-Weinberg law. In a random mating population, a character is governed by a single gene with two alleles *A* and *a*. Assuming that the frequency of *A* is *p* and that of *a* is *q*, compute the genotypic frequencies in the population. Show that these frequencies will remain unchanged in the next generation, assuming random union of gametes as well as random mating among genotypes. 2+12=14

8. (a) Define hybridization. Briefly describe the different types and the objectives of hybridisation. 7
   (b) Describe the backcross method with the help of a suitable example. Discuss the applications of backcross method. 7

UNIT–V

9. Define heterosis. Discuss its manifestations. Discuss the two major theories proposed to explain heterosis. 2+5+7=14

10. (a) Define inbreeding depression. Briefly discuss the degrees of inbreeding depression encountered in crop species. 7
    (b) Give an account of the breeding methods for disease resistance. 7