

Reg. No

Name

25P2054

M. Sc. DEGREE END SEMESTER EXAMINATION - APRIL 2025

SEMESTER 2 : BOTANY

COURSE : 24P2BOTT08 : GENETICS AND EVOLUTION

(For Regular - 2024 Admission)

Time : Three Hours

Max. Weights: 30

PART A

Answer any 8 questions

Weight: 1

1. What is the bottleneck effect? Give an example. (U, CO 1, CO 2)
 2. What is linkage? How does it differ from independent assortment? (U, CO 1, CO 2)
 3. Explain Convergent evolution with an example. (A, CO 4, CO 6)
 4. Explain the concept of molecular divergence and molecular clocks. (A, CO 5)
 5. What is the role of the Jpx gene in X-chromosome inactivation? (A, CO 3)
 6. Write a note on reproductive isolation. (A, CO 4, CO 6)
 7. Discuss about the Paradox of sex hypothesis. (A, CO 4)
 8. What is an FDS ascus? (U, CO 1, CO 2)
 9. Define natural selection and mention its types. (I)
 10. Discuss about the two types of abiogenesis (A, CO 4)
- (1 x 8 = 8)**

PART B

Answer any 6 questions

Weights: 2

11. Discuss about the significance and process of natural selection and adaptations. (A, CO 4, CO 6)
 12. Discuss the causes and consequences of genetic drift in small populations. (An, CO 1, CO 2)
 13. Using a suitable example, explain how to measure the mutation rate in a population. (A, CO 1, CO 2)
 14. Describe the epigenetic effects of environmental chemicals on gene expression. (I)
 15. Explain the different types of speciation. (A, CO 4, CO 6)
 16. Explain the molecular mechanism by which DNA methylations are maintained in cells. (A, CO 3)
 17. Co-evolution played a vital role in evolutionary process, Explain. (A, CO 4)
 18. Construct an imaginary pedigree chart with a minimum of three generations for an autosomal dominant disorder. (Cr, CO 1, CO 2)
- (2 x 6 = 12)**

PART C**Answer any 2 questions****Weights: 5**

19. In a Mendelian population, the frequencies of alleles 'A' and 'a' are 'p' and 'q', respectively. If evolutionary forces are not acting, prove that the population is in Hardy-Weinberg equilibrium. (E, CO 1, CO 2)
20. Explain the various molecular processes that lead to epigenetic changes. (An, CO 3)
21. Explain the process of histone modification by TrxG and PcG proteins. (An, CO 3)
22. Explain different types of inheritance patterns in pedigree analysis. ()
- (5 x 2 = 10)**

OBE: Questions to Course Outcome Mapping

CO	Course Outcome Description	CL	Questions	Total Wt.
CO 1	Explain the Hardy-Weinberg equilibrium and evolutionary forces responsible for shaping the gene pool.	A	1, 2, 8, 12, 13, 18, 19, 22	19
CO 2	Analyze and solve problems related to map distance, gene order, Coefficient of Coincidence, Interference and population genetics.	An	1, 2, 8, 12, 13, 18, 19, 22	19
CO 3	Explain the effect of epigenetic in inheritance of characters.	A	5, 14, 16, 20, 21	15
CO 4	Explain the process of evolution.	A	3, 6, 7, 9, 10, 11, 15, 17	11
CO 5	Describe modern theories of evolution.	U	4	1
CO 6	Discuss adaptive radiation and speciation.	U	3, 6, 9, 11, 15	7

Cognitive Level (CL): Cr - CREATE; E - EVALUATE; An - ANALYZE; A - APPLY; U - UNDERSTAND; R - REMEMBER;