

**M. Sc. DEGREE END SEMESTER EXAMINATION - MARCH 2024****SEMESTER 2 - BOTANY****COURSE : 21P2BOTT06 - MOLECULAR BIOLOGY AND IMMUNOLOGY***(For Regular - 2023 Admission and Improvement/Supplemenmtary 2022/2021 Admissions)*

Duration : Three Hours

Max. Weights: 30

**PART A****Answer any 8 questions****Weight: 1**

1. What are HDNA? (U, CO 5)
2. Give an account on the regulation of Lac Operon. (U, CO 2, CO 3, CO 4, CO 6)
3. Explain the opposite polarity of the double stranded DNA. (U, CO 5)
4. Briefly explain mechanism of mRNA export from nucleus to the cytoplasm. (An, CO 2, CO 4, CO 5)
5. Write a brief account on IS elements. (U, CO 2)
6. What are codons? Explain Ochre codon? (U, CO 3, CO 4)
7. Briefly explain the process of t-RNA charging. (U, CO 4, CO 6)
8. Explain inducers and repressors. (An)
9. What is meant by sequential and conformational epitope? (R, CO 1)
10. Differentiate between class I and class II MHC molecules. (An, CO 1)  
**(1 x 8 = 8)**

**PART B****Answer any 6 questions****Weights: 2**

11. Differentiate between monoclonal and polyclonal antibodies. (An, CO 1)
12. Discuss the advantages of recombinant vaccines? (E, CO 1)
13. Analyze and explain the mechanism of homologous recombination? (An, CO 2)
14. Explain and analyze the stages and molecular components that takes part in the elongation of DNA replication in prokaryotes. (An, CO 2)
15. Differentiate c-value from c-value paradox. (U, CO 2)
16. Briefly explain RNA Polymerase III promoters. (An, CO 4, CO 5, CO 6)
17. Give an account on RNA polymerase II. (U, CO 2, CO 3, CO 5)
18. Explain split genes and explain the self splicing mechanisms of RNA processing. (R, CO 3, CO 4, CO 5)  
**(2 x 6 = 12)**

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

19. Draw a typical eukaryotic gene and the pre-mRNA and mRNA derived from it. Assume that the gene contains three exons. Identify the following items and for each item, give a brief description of its function: (A, CO 2, CO 3, CO 4)

- a) 5' untranslated region
- b) promoter
- c) AAUAAA sequence
- d) Transcription start site
- e) 3' untranslated region
- f) Introns
- g) Exons
- h) Poly(A) tail
- i) 5'Cap

20. Write an essay on molecular mechanism of recombination. (U, CO 2)
21. Analyze the structure of alternate forms of DNA with a note on their respective roles. (An, CO 5)
22. Classify and explain the four defensive barriers of innate immunity. (A, CO 1)  
**(5 x 2 = 10)**

OBE: Questions to Course Outcome Mapping

CO	Course Outcome Description	CL	Questions	Total Wt.
CO 1	Explain the basic properties, structure and functions of genetic materials and molecules associated with the immune system.	U	9, 10, 11, 12, 22	11
CO 2	Explain the central dogma of molecular biology.	R	2, 4, 5, 13, 14, 15, 17, 19, 20	21
CO 3	Develop a thorough knowledge in gene expression mechanisms.	E	2, 6, 17, 18, 19	11
CO 4	Analyze the mechanism of DNA repair systems.	An	2, 4, 6, 7, 16, 18, 19	13
CO 5	Examine the alternate forms of DNA and its significance	E	1, 3, 4, 16, 17, 18, 21	14
CO 6	Classify various RNA molecules and its diverse functions in biological systems.	R	2, 7, 16	4

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