

**NOVEMBER 2024**

**57152/416C1B**

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Time : Three hours

Maximum : 75 marks

PART A — ( $10 \times 1 = 10$  marks)

Answer any TEN questions each in 50 words.

1. Name one type of APC.
2. What are the key functions of the secondary lymphoid organs in the immune system?
3. Define the term “antigen diversity”.
4. What is clonal proliferation in the context of lymphocyte activation?
5. Name two labeled assays used in immunology.
6. Tumor immunology.
7. Methylation.
8. Regulation of gene expression.
9. Phosphorylation.

10. What is the significance of transposons in genetics?
11. What is the role of transposable elements in the evolution of organisms?
12. Complex transposons.

PART B — ( $5 \times 5 = 25$  marks)

Answer any FIVE questions each in 200 words.

13. Discuss the role of antigens in the immune system, specifically addressing antigenicity and immunogenicity.
14. Compare and contrast the production and application of monoclonal and polyclonal antibodies.
15. Elaborate on the techniques of precipitation and agglutination in diagnostic immunology and their applications in disease diagnosis.
16. Describe the structure of a eukaryotic chromosome, including the organization of chromatin, centromeres and telomeres.
17. Explain the role of nucleosomes in compacting DNA in eukaryotic cells and the significance of histone proteins.

18. Compare and contrast the three main gene transfer mechanisms, highlighting their differences and similarities.
19. Discuss the concept of retroposons and their role in genetic transposition.

PART C — ( $4 \times 10 = 40$  marks)

Answer any FOUR questions each in 500 words.

20. Provide a comprehensive explanation of the origin, development and differentiation of T and B lymphocytes, highlighting the key stages and factors involved.?
21. Provide an in-depth overview of immunoglobulins, covering their structure, functions and the role they play in the immune response.
22. Provide an overview of vaccines and adjuvants, discussing different types of vaccines, their development, and the role of adjuvants in enhancing vaccine efficacy.
23. Explain the various genome modifications and discuss how these modifications influence the structure and function of chromatin and gene regulation.

24. Discuss the structure and function of insertion sequences, complex transposons, and compound transposons, with a focus on their role in transposition and genetic rearrangements.
  25. Explain in detail about the structure and genes of the Major Histocompatibility Complex (MHC). How does MHC contribute to immune recognition and regulation?
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