

**LMDQ/D-23**  
**IMMUNOLOGY**  
**Paper : BT-304**

Time : Three Hours]

[Maximum Marks : 80

**Note :** There are nine questions in all. Question No. 1 is compulsory. Candidates are required to attempt Question No. 1 and four others selecting *one* question from each Unit. All questions carry equal marks.

**Compulsory Question**

1. (a) What is the difference between humoral and cell-mediated immunity?
- (b) What are Freund's complete adjuvants?
- (c) What is the difference between affinity and avidity?
- (d) What are null cells?
- (e) Name some members of Immunoglobulin super-family.
- (f) Which antibodies are present in secretions?
- (g) Name some nobel laureates in the field of Immunology.
- (h) What is ADCC? (8×2=16)

## **UNIT-I**

2. (a) Illustrate the relationship between innate and acquired immunity? (4)
  - (b) How is inflammation response generated in case of injury? (4)
  - (c) Discuss in detail about the functioning of antigen presenting cells giving their mechanism of degrading the antigen. (8)
3. Discuss the structure and functions of all the primary and secondary lymphoid organs in detail. (16)

## **UNIT-II**

4. (a) What are the requirements of immunogenicity? (2)
  - (b) If we want to separate B-cells from T-cells, which technique we will apply? Explain the procedure and principle of the techniques. (4)
  - (c) Write down different classes of antibodies and discuss their functions. (10)
5. (a) With the help of diagrams, explain the random gene rearrangement in case of immunoglobulin heavy chain. (6)
  - (b) What are the different antigenic determinants on immunoglobulins? (5)
  - (c) What is agglutination? What are its different variants? (5)

### UNIT-III

6. With the help of suitable illustrations, describe different pathways of complement system and discuss the role played by the complement system giving its functions as well. (16)
7. (a) Discuss the structures of MHC-I and MHC-II molecules. What is the role of major histocompatibility complex in generating immune response in the body? (6)
- (b) Which are the signal transduction molecules that are associated with membrane immunoglobulins? (6)
- (c) Which are the antigen-specific T-cell receptors? (4)

### UNIT-IV

8. Who discovered Hybridoma technology? How monoclonal antibodies are produced through this technology? Discuss their applications. (16)
9. Write short notes on the following :
- (a) Subunit vaccines. (5)
- (b) Live attenuated vaccines. (5)
- (c) Recombinant vaccines. (6)
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