

Time Allotted : 3 hrs

Full Marks : 70

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group – A**  
**(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Pattern recognition receptors (PRR) include  
(a) Lectin-like molecules (b) Lipoteichoic acid (c) PAMPs (d) LPS.
  - (ii) Which of the following convey the longest lasting immunity to an infectious agent?  
(a) Naturally acquired passive immunity  
(b) Artificially acquired passive immunity  
(c) Naturally acquired active immunity  
(d) All of these.
  - (iii) B cells that produce and release large amounts of antibody are called  
(a) Memory cells (b) Basophils  
(c) Plasma cells (d) Killer cells.
  - (iv) Fusion between a plasma cell and a tumour cell creates a  
(a) Myeloma (b) Lymphoblast (c) Hybridoma (d) Natural killer cell.
  - (v) The CD4 molecule is a  
(a) a heterodimer (b) receptor for Class II MHC  
(c) a part of BCR (d) a complement receptor.
  - (vi) Haptens  
(a) require carrier molecules to be immunogenic  
(b) react with specific antibodies when homologous carriers are not employed  
(c) interact with specific antibody even if the hapten is monovalent  
(d) cannot stimulate secondary antibody responses without carriers.

- (vii) HIV requires which enzyme?  
 (a) DNA Polymerase (b) RNA Polymerase  
 (c) Reverse Transcriptase (d) All of the above.
- (viii) A suitable organism for use in recombinant vaccines is  
 (a) Influenza virus (b) smallpox virus  
 (c) poliomyelitis virus (d) vaccinia virus.
- (ix) Which of the following is not a characteristic of IgG?  
 (a) Its L chains are either  $\kappa$  or  $\lambda$   
 (b) It is the largest of all the Igs  
 (c) It is the predominant Ig in peritoneal fluid  
 (d) It crosses the placenta.
- (x) The use of a leg vein to repair a damaged coronary artery in a bypass operation is an example of  
 (a) Allograft (b) Xenograft (c) Heterograft (d) Autograft.

**Group – B**

2. (a) Describe the different phases of humoral and cell-mediated immune responses.  
 (b) Explain the different steps of immune response during a viral infection.  
**6 + 6 = 12**
3. (a) Discuss the functions of cells of the innate immune system.  
 (b) Describe the characteristics and functions of different immunoglobulins.  
**6 + 6 = 12**

**Group – C**

4. (a) What is an Abzyme?  
 (b) Describe the rationale behind the preparation of monoclonal antibodies?  
 (c) What do you mean by HAMA?  
 (d) What are different ways of Antibody engineering by Fc fragments?  
**2 + 4 + 2 + 4 = 12**
5. (a) What are the applications of phage display libraries?  
 (b) Discuss the technique of Sandwich ELISA.  
 (c) Describe the various applications of bispecific antibodies.  
**4 + 4 + 4 = 12**

**Group – D**

6. (a) Conduct an experiment to prove that antigen processing is necessary for  $T_H$  activation.  
 (b) Describe the principle of screening of anti-HLA antibodies.  
 (c) Discuss the immunological role of lymphokines and chemokines.  
**4 + 4 + 4 = 12**
7. (a) What are alloantigens?  
 (b) What do you mean by Graft versus host disease?  
 (c) Discuss the mode of action of Interferons.  
**2 + 5 + 5 = 12**

**Group – E**

8. (a) What do you mean by clonal anergy?  
 (b) Discuss the different pathways of immune regulation by peripheral tolerance.  
 (c) Illustrate the pathways of immediate hypersensitivity.  
**4 + 4 + 4 = 12**
9. (a) Distinguish between primary and secondary immunodeficiency.  
 (b) Explain with examples the different ways of active and passive immunization.  
 (c) What do you mean by peptide vaccine and conjugate vaccine?  
**4 + 4 + 4 = 12**