Total No. of printed pages = 5

63/2 (SEM-2) BIT 201

2022

BIOTECHNOLOGY

(Theory paper)

Paper Code : BIT 201

(Immunology)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Answer any *six* of the following questions : 1×6=6

   (a) Which one of the following Pattern Recognition Receptors (PRRs) is involved in generating innate immune responses to viruses ?

   (i) TLR3

   (ii) TLR4

   (iii) TLR6

   (iv) TLR2

[Turn over

(b) Identify the professional antigen-presenting cell from the following options

(i) Dendritic-cells and B-cells

(ii) Keratinocytes

(iii) Mast cells

(iv) Neutrophils

(c) Which one of the following statements about antigen presentation is not correct ?

(i) Intracellular viral antigens are processed via an endogenous pathway for loading the processed antigens on MHC class I to activate CD8-positive cells

(ii) Extracellular pathogens are processed via an exogenous pathway to activate CD4-positive cells

(iii) Exogenous antigen-presenting pathway is inhibited by protein synthesis inhibitor drugs

(iv) T-cells can recognize and are activated only when the processed antigenic peptide is loaded on the appropriate MHC molecules

(d) Opsonization is one of the most important effector functions of IgG for enhancing which one of the following ?

(i) Phagocytosis (ii) Pinocytosis

(iii) Efferocytosis (iv) Apoptosis

(e) The initial complement component that is bound by complement-fixing antibodies is

(i) C1q (ii) C1s

(iii) C3b (iv) C5a

(f) Why most of the vaccination are done at infant stage ?

(g) Which of the following gene clusters do not contribute to antigen binding ?

(i) V_L (ii) C_L

(iii) V_H (iv) D.

2. Answer any *five* of the following questions : 2×5=10

(a) Distinguish between T-Cell Receptor and B-Cell Receptor.

(b) Distinguish between Type-I hypersensitivity and Type-II hypersensitivity.

(c) Distinguish between Epitope and Paratope.

(d) Distinguish between innate immune response via TLR4 and TLR2.

(e) Describe antigen-presenting cells of the immune system.

(f) Describe immune cells that attack viruses and tumor.

3. Write short notes on any *six* of the following : 5×6=30

(a) Describe in detail about the cells of innate and adaptive immune system.

(b) Explain the functional differences between naive B-cells and memory B-cells.

(c) Demonstrate briefly the antigen processing pathway for intracellular and extracellular pathogens.

(d) Describe the mechanism of activation of B-cells and T-cells.

(e) Antigen-Antibody Interaction.

(f) Graft rejection.

(g) Cell Mediated Immunity.

4. Answer any *two* of the following questions : 10×2=20

(a) Write in detail on the properties and biological functions of classes and subclasses of human serum immunoglobulins. 10

(b) What is immunoelectrophoresis ? Describe the use of the technique for the separation of charged biomolecules with labeled diagram. 8+2=10

(c) What is Antibody Dependent Cell Mediated Cytotoxicity ? Describe the mechanism of action of ADCC with a labelled diagram. 10

5. Answer any *one* of the following questions : 14×1=14

(a) Describe class switching of antibody with suitable diagram. What is the significance of antibody diversity ? 12+2=14

(b) Describe different types of antigen presentation with suitable example. 14