

Ph.D. Course Work (Aug, 2022)
Code: PHBC105, Elective Paper: Department of Biochemistry
Title: Immunology

Time: Three Hours

Maximum Marks: 100

(Write your Roll No. at the top immediately on receipt of this question paper)
Answer ALL questions. All parts of a question must be answered in continuation. Start answering each question from a new page. Cite examples and draw labeled diagrams.

Question1: Attempt any 10 of the following(from part A and B) [10X2=20]

(A) Differentiate among (giving examples) following

- I. Apoptosis, autophagy and necrosis
- II. Isotype, Allotypes and Idiotypes
- III. Antigen and Immunogen
- IV. Types of hypersensitivity and their mediators
- V. Indirect, sandwich and competitive ELISA
- VI. ELISA, RIA and ELISPOT assay
- VII. Primary and secondary response to antigen
- VIII. Initiator caspases, executioner caspases and inflammatory caspases
- IX. PAMPs and DAMPs of innate immunity
- X. MHC Class I and MHC Class II Proteins
- XI. Antigens, Haptens and Adjuvants
- XII. Myeloid and lymphoid progenitors during hematopoiesis
- XIII. Primary and secondary lymphoid organs

(B) Fill in the blanks

- XIV. The macrophage cells in kidney and brain are popularly known as and respectively.
- XV. Only antigen-presenting cells express class.....MHC molecules, whereas nearly all cells express class.....MHC molecules.

Question 2: Give detail account of any 4 of the following.

[4X5=20]

- A. Discuss the cytokines for exhibition of pleiotropy, redundancy, synergy, antagonism, cascade induction
- B. Summarize the mechanism and diversity of T-cell receptors?
- C. Discuss the principle and use of following techniques in immunology
 - (i) Immunoprecipitation, (ii) Cytotoxicity assay
- D. Explain briefly following antibody mediated effector functions
 - I. Neutralization

- II. Agglutination
 - III. Opsonization
 - IV. Complement fixation
 - V. Degranulation
- E. Explain humoral immunity and its significance.
- F. For each pair of antigens listed below, indicate which is likely to be more immunogenic. Explain your answer.
- I. Native bovine serum albumin (BSA) and Heat-denatured BSA
 - II. Hen egg-white lysozyme (HEL) and Hen collagen
 - III. A protein with a molecular weight of 30,000 and A protein with a molecular weight of 150,000
 - IV. BSA in Freund's complete adjuvant and BSA in Freund's incomplete adjuvant

Question 3: Give detail account of any 3 of the following.

[3X20=60]

- A. Explain with the help of a well labelled diagram classical pathway of complement system.
- B. Explain the mechanisms of processing and presentation of exogeneous and endogenous antigens.
- C. Describe the detailed structures of different classes of antibodies.
- D. Discuss the mechanisms for immune response against tumors.
- E. Discuss about hybridomas and their production.
- F. Explain the potency of immunotherapy in cancer treatment.
