

Code: PHBC 105

Your Roll No.

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

Time: Three Hours

Maximum Marks: 75

(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.

Question 1: Attempt any 10 of the following

[10X1.5=15]

- I. Antigen stimulate the immune system, while immunogens provoke:

A) Allergic reactions	B) Immune responses
C) Autoimmune disorders	D) None of the above
- II. _____ play a role in initiating apoptosis, while _____ carry out the process.

A) Initiator caspases; Executioner caspases	B) Executioner caspases; Initiator caspases
C) Inflammatory caspases; Initiator caspases	D) Inflammatory caspases; Executioner caspase
- III. Myeloid progenitors give rise to:

A) Red blood cells	B) Platelets
C) White blood cells	D) All of the above
- IV. How does the immune system recognize and target cancer cells?

A) By promoting cancer cell growth	B) By suppressing immune responses
C) By identifying cancer-specific antigens	D) By avoiding immune detection
- V. Immunological tolerance refers to the immune system's ability to:

A) Respond aggressively to all foreign substances	B) Recognize and tolerate self-antigens
C) Suppress the activity of white blood cells	D) Inhibit the production of antibodies
- VI. MHC Class I presents antigens to _____ cells, while MHC Class II presents to _____ cells.
- VII. Primary lymphoid organs, such as the _____, and secondary lymphoid organs, like the _____, serve crucial roles in the immune system.
- VIII. H1N1 is a subtype of the _____ virus.
- IX. Complement fixation involves the binding of complement proteins to the surface of a pathogen, leading to the formation of the _____ complex.
- X. The phenomenon where the immune system does not respond to specific antigens is known as _____ tolerance.
- XI. Explain the distinctions among isotype, allotypes, and idiotypes.
- XII. Contrast ELISA, RIA, and ELISPOT assays.
- XIII. Define antigens, haptens, and adjuvants and highlight their distinctions.
- XIV. Enumerate the types of hypersensitivity reactions and identify their mediators.
- XV. Compare indirect, sandwich, and competitive ELISA techniques.

Question 2: Give detail account of any 4 of the following. (No more than 2 page for each answers)[4X5=20]

- A. Explain the principle and applications of Immunoprecipitation and Cytotoxicity Assay in immunology.
- B. Explain the concept of clonal selection in the context of the immune response.
- C. Provide a brief overview of the interaction between antigens and antibodies in the immune system.
- D. Provide brief explanations for the antibody-mediated effector functions, including neutralization, agglutination, opsonization, complement fixation, and degranulation.
- E. Explain the key principles and approaches involved in cancer immunotherapy, used in following methods: Immune checkpoint inhibitors based therapy; T-cell transfer therapy; Monoclonal antibodies based therapy; Treatment vaccines; Immune system modulators based therapy.
- F. Summarize the interplay between cytokines and co-stimulatory molecules in the immune system, highlighting their roles and significance in immune responses.

Question 3: Give detail account of any 2 of the following. (No page limit) [2X20=40]

- A. Elaborate on the classical pathway of the complement system, incorporating a well-labeled diagram to illustrate the sequential steps and interactions involved.
- B. Provide a comprehensive description of the detailed structures of various classes of antibodies, elucidating their unique features and functional properties.
- C. Examine the concept of hybridomas and elucidate the processes involved in their production, emphasizing their significance in the generation of monoclonal antibodies.
- D. Discuss in depth the diverse mechanisms employed by the immune system in mounting responses against tumors, considering both innate and adaptive immune components.
- E. Discussion immunodeficiency disorders, exploring the various types, their underlying causes, clinical manifestations, and potential therapeutic approaches.
- F. Examine the phenomenon of autoimmunity in detail, explaining into the mechanisms that lead to the loss of immune tolerance, the role of genetic and environmental factors, and the diverse autoimmune diseases affecting different organ systems.
