

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2026

B.Tech-IV Semester (BT)

Course Code (Credits): 25B11BT413 (3)

Max. Marks: 35

Course Name: Immunology

Course Instructor: Dr. Abhishek Chaudhary

Max. Time: 2.0 Hour

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculators is not allowed

Q.No	Question	CO	Marks
Q1	a. Describe the pathogenesis of Type III hypersensitivity reactions. Explain how immune complexes are formed, deposited in tissues, and lead to inflammation. b. Elaborate the role of ADCC and complement system in Type II and Type III hypersensitivity reactions. Discuss how complement activation contributes to tissue damage and inflammation. c. A patient develops Drug-Induced Hemolytic Anemia after multiple dose of Antibiotic-X, while another person develops Serum Sickness. Identify the types of hypersensitivity involved in both cases and explain the underlying immunological mechanisms.	CO-5	3+3+3
Q2	a. You are given two solutions, one containing protein X and the other containing antibody to protein X. When you add 1 ml of anti-X to 1 ml of protein X, a precipitate forms. But when you dilute the antibody solution 200-fold and then mix 1 ml of the diluted anti-X with 1 ml of protein X, no precipitate forms. I. Explain why no precipitate formed with the diluted antibody. II. Which species (protein X or anti-X) would likely be present in the supernatant of the antibody-antigen mixture in each case? b. Explain the difference between antibody affinity and antibody avidity. Which of these properties of an antibody better reflects its ability to contribute to the humoral immune response to invading bacteria?	CO-2	2+2+2
Q3	Draw diagrams illustrating the general structure, including the domains, of class I MHC molecules, class II MHC molecules, and membrane-bound antibody on B cells. Label each chain and the domains within it, the antigen-binding regions, and regions that have the immunoglobulin-fold structure	CO-3	6

Q4	a. Discuss the concept of Autoimmune Disease with reference to its underlying immunological mechanisms. In your answer, explain the role of self-tolerance, genetic and environmental factors in the development of autoimmunity. Further, classify autoimmune diseases with suitable examples and describe their diagnostic approaches. b. Give examples of mild and severe consequences of immune dysfunction. What is the most common cause of immunodeficiency throughout the world today?	CO-4 CO-3	6+2
Q5	a. What was the significance of the accidental re-inoculation of some chickens that Pasteur had previously exposed to the bacteria that causes cholera? Why do you think these chickens did not die after the first exposure to this bacterium? b. Infants immediately after birth are often at risk for infection with Streptococcus. A vaccine is proposed for administration to women of childbearing years. How can immunizing the mothers help the babies? c. What is the difference between the discarded instructional theory for lymphocyte specificity and the selection theory, which is now the accepted explanation?	CO-1 CO-3	2+2+2