JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2025

M.tech / M.Sc-II Semester (BT/Micro)

COURSE CODE (CREDITS): 14M11BT212/18MS1BT211 (3-0-0) MAX. MARKS: 35

COURSE NAME: Immunotechnology/Immunology and Immunotechnology

COURSE INSTRUCTORS: Dr. Tyson MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

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

Q.No	Question	Marks
Q1	In what ways do cytokine environments influence the specialization of $CD4^+$ T cells and the subsequent regulation of immunoglobulin isotype switching?	3
Q2	Describe the classification of Human Leukocyte Antigens (HLA) and distinguish between Class I and Class II HLA molecules in terms of their structure and function. How do these differences affect antigen presentation and the resulting immune response?	4
Q3	a) Illustrate the different immune mechanisms that lead to graft rejection over time by comparing early and late responses following transplantation. Provide clinical examples to support your discussion. b) Additionally, explain the circumstances under which immune reactions can be initiated by the graft itself against the host, and outline strategies for prevention and management of such responses.	4+2
Q4	**a.** Explain the principle of hybridoma technology in the production of monoclonal antibodies and how these antibodies can be engineered for therapeutic purposes. **b.** Classify the different types of monoclonal antibodies based on their source and structure. Provide examples of monoclonal antibodies used in cancer therapy and their specific targets.	4+3
Q5	Hypersensitivity reactions are classified into four types based on their immunological mechanisms. Select any two types and compare their underlying immune responses, time course, and clinical manifestations.	5

	Support your answer with appropriate examples and discuss the implications for diagnosis and treatment.	
Q6	Describe the sequential stages of B cell development beginning in the bone marrow and continuing to the formation of mature naïve B cells in peripheral lymphoid organs.	5
Q7	Explain the role of adjuvants in shaping the type and strength of immune responses elicited by vaccines. How would you select an appropriate adjuvant for a vaccine targeting a viral infection versus a bacterial infection?	5