

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2025

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

COURSE CODE (CREDITS): 14M11BT212/18MS1BT211 (3-0-0)

MAX. MARKS: 25

COURSE NAME: Immunotechnology/Immunology and Immunotechnology

COURSE INSTRUCTORS: Dr. Tyson

MAX. TIME: 1 Hour 30 Min

**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	How does bacterial lipopolysaccharide (LPS) function as a pathogen-associated molecular pattern (PAMP) to activate the innate immune response, and how do B and T cells contribute to the immune response against LPS-containing bacterial infections.	3
Q2	Compare the use of RIA versus ELISA for detecting infectious disease markers. In what scenarios would RIA be preferred despite the safety concerns?	3
Q3	If a self-reactive T cell escapes central tolerance due to a defective AIRE gene but fails to cause autoimmunity, what possible peripheral mechanisms might be redundantly ensuring immune tolerance?	4
Q4	Trace the journey of a T-cell from bone marrow to thymic emigration, highlighting key developmental checkpoints and fates of thymocytes that fail selection.	5
Q5	Somatic hypermutation introduces random mutations in immunoglobulin genes, yet paradoxically leads to higher-affinity antibodies. Explain.	5
Q6	While both pathways ultimately activate B cells, the T-dependent and T-independent routes differ drastically in their cellular interactions, signaling requirements, and immunological outcomes. Elaborate on these differences, including the implications for antibody quality, memory formation, and the types of antigens involved.	5