

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2026

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 INSTRUCTOR: 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

(c) Use of calculator is not allowed

Q.No	Question	Marks
Q1	Discuss the indirect role of cytokines in regulating B cell response and antibody production during a T-dependent immune response. Explain how T helper cells act as intermediaries and describe the specific contributions of at least three important cytokines in this process.	4
Q2	Describe the importance and regulatory mechanisms of peripheral tolerance in maintaining immune homeostasis.	4
Q3	Explain the general immunological pathway against parasitic infections (helminths and protozoa). Describe the key steps and the main cells involved in response.	4
Q4	A diagnostic kit designed for rapid field detection of disease produces visible colored bands within minutes after application of the sample. The assay does not require sophisticated laboratory equipment and is widely used for point-of-care testing. a) Explain the principle and working mechanism of lateral flow immunoassay. b) Describe the major components involved in the test strip and their functions. c) Mention any two applications and one limitation of this assay.	2x3=6
Q5	During maturation in the thymus, immature T lymphocytes are exposed to different cellular interactions that determine whether they survive, mature, or undergo cell death. a) Describe the major stages of T-cell development in the thymus. b) Explain the role of selection processes in the maturation of functional T lymphocytes.	3x2=6

Q6	A biotechnology company plans to produce monoclonal antibodies for rapid detection of pregnancy hormone (hCG). a) Outline the major sequential steps involved in hybridoma technology. b) Why is HAT medium used after cell fusion? c) Mention advantage of monoclonal antibodies in diagnostic assays.	2x3=6
Q7	Following transplantation, some grafts survive for prolonged periods whereas others are rapidly rejected due to immune recognition of donor tissues. Discuss the immunological basis of graft rejection and graft acceptance.	5