

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2024

M.tech (BT) / ~~M.Sc (Micro)~~

COURSE CODE (CREDITS): 14M11BT212 / ~~18MS1BT2+1~~ (3:0:0) MAX. MARKS: 25

COURSE NAME: Immunotechnology / ~~Immunology and Immunotechnology~~

COURSE INSTRUCTORS: Dr. Tyson

MAX. TIME: 1 Hour 30 Minutes

**Note: (a) All questions are compulsory.**

**(b) Marks are indicated against each question in square brackets.**

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

1. Write the primary components and difference between the innate and adaptive immune systems, and how do they interact to protect the body from pathogens? **2 Marks (Co-1)**
2. Given a scenario where a patient presents with history of malar rash, discoid Rash, joint pain, photosensitivity and renal involvement. **2 Marks (Co-2)**
  - a) Diagnose the autoimmune condition.
  - b) Write the different auto-antibodies formed in disease.
3. Describe the different mechanism of peripheral tolerance for the establishment for T cells in maintaining immune homeostasis and preventing autoimmune reactions. **3 Marks (Co-1)**
4. How is MHC class I and MHC class II molecules different in terms of structure and function? Explain. **3 Marks (Co-1)**
5. Describe the activation mediators for the different pathways of complement system and write main functions of the complement system in generating immune response. **3 Marks (Co-1)**

6. Discuss the underlying mechanisms and clinical manifestations of type IV hypersensitivity reactions. Illustrate your answer with examples of diseases where type IV hypersensitivity plays a significant role in pathogenesis. Additionally, discuss potential therapeutic strategies targeting type IV hypersensitivity reactions.  
**4 Marks (Co-2)**
7. Explain the different pathways of B cell activation upon encountering an antigen. Additionally, discuss the importance of cytokines in modulating B cell responses during activation.  
**4 Marks (Co-1)**
8. Discuss the coordinated regulation of somatic hyper mutation (SHM) and class switching response (CSR) in germinal center reactions. Explain how germinal center B cells undergo both SHM and CSR to generate high-affinity antibodies of different isotopes.  
**4 Marks (Co-1)**