

B.E. (Biotechnology) Fourth Semester  
BIO-415: Immunology and Immuno-Technology

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

- I. Define the following terms:-
- Hapten
  - Antigen
  - Immunogen
  - Precipitation
  - Agglutination
  - Cytokines
  - Monoclonal antibodies
  - Secondary lymphoid organs
  - Artificially acquired active immunity
  - MHC molecules

(10x1)

UNIT - I

- II. Mention about the cells which participate in the specific (adaptive/acquired) immune response. (10)
- III. Show the structure of IgM and sIgA immunoglobulins along with their properties. (10)
- IV. Name at least three types of antigen presenting cells (APCs). How do they process and present the antigens to T cells? (10)

UNIT - II

- V. a) Explain about an autoimmune disease which represents type III hypersensitivity.  
b) Explain the sensitization and effector phases of type IV hypersensitivity. (2x5)

P.T.O.

(2)

- VI. Give an account of various types of vaccines along with limitations of each of those. (10)
- VII. What is your understanding about the following:-
- a) Direct and Indirect ELISA
  - b) Western blotting (2x5)

x-x-x