

M.Sc. BIOTECHNOLOGY
Third Semester
IMMUNOLOGY
(MBT - 12)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

Answer any *five* of the following questions:

1. Define innate immunity. Give brief description about all the elements of innate immunity. What are the differences between innate and acquired immunity?
(2+5+3=10)
2. What are the different types of cells involve in immune system? Describe the function of each type of cells in immune system.
(3+7=10)
3. Draw the structure of an Antibody with proper labelling. What are the various types of antibody? Mention their structural and functional characteristics.
(4+1+5=10)
4. What are Epitopes? Differentiate between Antigenicity and Immunogenicity. Why antigen processing and presentation is important? Explain Endocytic pathway of antigen processing.
(1+3+2+4=10)
5. What is antigen? What is the function of epitopes? What are the characteristic a substance must possess to be immunogenic?
(1+1+8=10)
6. Write in brief about pathway of complement activation. What are the biological consequences of complement activation?
(4+6=10)

7. Write short notes on any *five* from the list below: (2×5=10)

Hybridoma technology, DAS-ELISA, RIA, Immuno-electrophoresis,
Immunodiffusion, Immunoblotting, Monoclonal antibody, Autoimmune diseases.

8. Explain the structure of class II MHC molecule. Define avidity, affinity and cross reactivity. Explain ELISA with types. (4+3+3=10)

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Duration: 20 minutes

Marks – 20

(PART A - Objective Type)

I. Choose the correct answer:

1×20=20

- Inflammation does not involve—
 - Cytokine production by macrophages.
 - Migration of leukocytes out of the circulation.
 - Pain and swelling at the site of infection.
 - Secretion of antibodies.
- The antigen specificity of an adaptive immune response is due to—
 - Activation of antigen-specific lymphocytes.
 - Folding of antibody to fit in pathogen.
 - Lysis of only certain pathogens by neutrophils.
 - Phagocytosis of only certain pathogens by macrophages.
- Helper T cells are distinguished from cytotoxic T cells by the presence of —
 - CD2
 - CD3
 - CD4
 - Class II MHC antigen
- Toll-like-receptors (TLRs) play an important role in immune defence by recognizing—
 - Microbial components.
 - Conformational differences in antigenic proteins.
 - MHC-peptide complex.
 - Anti-idiotypic immunoglobulins.
- Which of the following is not a characteristic of a secondary immune response?
 - IgG affinity
 - Low affinity antibodies
 - High affinity antibodies
 - No lag phase
- The antigen processing cell in higher organisms is—
 - T-cell
 - Macrophage
 - Megakaryocyte
 - Eosinophil
- T cells and B cells are originated in—
 - Thymus
 - Bone marrow
 - Spleen
 - Lymph nodes
- The following two organs are examples of secondary lymphoid organs—
 - Spleen and thymus
 - Lymph nodes and thymus
 - Spleen and GALT
 - Bone marrow and MALT

9. Which one of the following does affect immunogenicity of a substance?
a. Making a molecule more foreign.
b. Making a molecule larger.
c. Increasing chemical complexity by adding amino acids.
d. All of the above.
10. Epitope is the discrete region on the antigen that interacts with—
a. Fab
b. Antibody's light and heavy chains
c. T-cell receptor
d. All of the above
11. Which of the following transplantation has the maximum success rate?
a. Autograph
b. Xenograph
c. Allograph
d. None of the above
12. Which of the following cell/cells express MHCII on the surface?
a. B-lymphocytes
b. Macrophages
c. Dendritic cells
d. All of the above
13. Antigenic peptides are presented to T-cells by—
a. TCR/CD3
b. CD28
c. CTL A4
d. MHC
14. How many disulfide bonds are there in a typical immunoglobulin molecule?
a. 2-5
b. 6-9
c. 10-20
d. 28
15. J chain or joining chain is found in—
a. IgM
b. IgA
c. IgM and IgA
d. IgE
16. The predominant antibody in saliva—
a. IgG
b. IgA
c. IgM
d. IgD
17. Monoclonal antibodies differ from polyclonal antibodies in their property of reacting with—
a. Specific epitope
b. Specific antigen
c. Specific clone of cells
d. All of the above
18. Inability to distinguish between self cells and non – self cells may lead to –
a. Hypersensitivity
b. Tolerance
c. Immunodeficiency
d. Autoimmunity
19. The functions of macrophages include –
a. Phagocytosis
b. Antigen presenting cell
c. Production of cytokines
d. All of the above
20. ELISA used to detect antigens or antibodies utilizes those enzymes that—
a. Have a high turnover rate.
b. Yield a stable coloured product.
c. Are stable on conjugation to proteins.
d. All of the above.
