(PART-B : Descriptive)

Time : 2 hrs. 40 min. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. Explain lymphoid follicles with germinal center. Discuss the mechanism of activation and action of macrophages. 10

2. Explain the structure of thymus and spleen with the help of a suitable diagram. 5+5=10

3. **a.** Define antigen, hapten, antigenecity and immunogenicity. 4+6=10
   b. Explain the factors effecting immunogenicity of an antigen.

4. What are interferons? Mention the major interferon types with their immunological significance. 2+8=10

5. Explain the structure of class I MHC molecule with a suitable diagram. What are haplotypes? Write a note on class switching of antibodies. 5+5=10

6. Discuss Gel and Coombs classification of hypersensitive reaction. Briefly describe the mechanism of Type-I hypersensitivity. 4+6=10

7. Mention the essential properties of a vaccine. Discuss how a vaccine can help in developing resistance against an infectious pathogen. Add a note on recombinant vector vaccine. 2+5+3 =10

8. What are the different types of monoclonal antibodies? Discuss the importance of monoclonal antibodies in immunodiagnostic process. Add a note on "side-chain" theory. 3+4+3 =10

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M.Sc. BIOTECHNOLOGY
SECOND SEMESTER
IMMUNOLOGY
MBT-202

(Use Separate Answer Scripts for Objective & Descriptive)

Duration : 3 hrs. **Full Marks : 70**

(PART-A : Objective)

Time : 20 min. **Marks : 20**

Choose the correct answer from the following: ***1×20=20***

1. Naturally acquired active immunity would be most likely acquired through which of the following processes?
   a. vaccination
   b. drinking colostrum
   c. natural birth
   d. infection with disease causing organism followed by recovery

2. Which of the following substances will not stimulate an immune response unless they are bound to a larger molecule?
   a. Antigen b. Virus
   c. Hapten d. Antibody

3. The basic Ig unit is composed of
   a. 2 identical heavy and 2 identical light chains.
   b. 2 identical heavy and 2 different light chains
   c. 2 different heavy and 2 identical light chains
   d. 2 different heavy and 2 different light chains

4. Cytokines always act
   a. By binding to specific receptors. b. In an autocrine fashion
   c. At long range d. Antagonistically with other cytokines

5. Which of the following immune cells/molecules are most effective at destroying intracellular pathogens?
   a. T helper cells b. T cytolytic cells
   c. B cells d. Complement

6. MAC is
   a. C5b6789 b. C5a6789
   c. C5b789 d. None

7. Biological role of complement system include
   a. Cell lysis and chemotaxis b. Opsonization
   c. Anaphylatoxins and Ab production d. All of these

8. Which of the following components of the innate immune system involves the release of histamine?
   a. Eosinophyll
   b. Neutrophyll
   c. Tissue mast cell
   d. All of the above

9. Class II MHC molecules are expressed by what type of cells?
   a. B cells
   b. Macrophages
   c. Dendritic cells
   d. All of the above

10. Which of the following Ab is first expressed on the surface of a neonate?
   a. IgG
   b. IgE
   c. IgA
   d. None of the above

11. Fc receptor mediated cell activation triggers cellular responses like
   a. Phagocytosis
   b. Antibody-dependent cellular cytotoxicity
   c. Release of inflammatory mediators
   d. All of the above

12. The functional affinity of all naturally occurring antibodies is dependent on the number of binding sites which is 10 in case of
   a. IgD
   b. IgM
   c. IgE
   d. IgG

13. The immunochemical technique that involves reactions occurring between anodically migrating antigens and cathodically migrating antibodies during electrophoresis is
   a. Immunoelectrophoresis (IEP)
   b. Immunofixation Electrophoresis (IFEP)
   c. Counterimmunoelectrophoresis (CIEP)
   d. Rocket Electroimmunodiffusion (REID)

14. Radioimmunoassay (RIA) involves the separation of a protein using the specificity of antibody-antigen binding and quantitation, utilizing a radioactive label, which is/are
   a. ^{125}I
   b. ^{3}H
   c. ^{14}C
   d. All of the above

15. The monoclonal antibody (mAb) type designed by combining the human constant regions with the intact rodent variable regions is
   a. Chimeric mAbs
   b. Murine mAbs
   c. Humanized mAbs
   d. None of the above

16. Monoclonal antibodies are routinely used in all of the following except
   a. the classification of leukemias
   b. the identification and epidemiological study of infectious microorganisms
   c. the identification of tumor antigens
   d. the manipulation of the immune response

17. Graft versus host disease results when the recipient lacks or has a poor immune system, and the donor organ and recipient express different
   a. HLA
   b. T cells
   c. Autoantibodies
   d. Interleukin

18. Pregnancy test detects the presence of
   a. Fetal proteins
   b. Human Chorionic Gonadotropoin (HCG)
   c. Agglutination
   d. Depuration factor

19. A tissue graft between two individuals who are not genetically identical is termed a/an
   a. Isograft
   b. Allograft
   c. Heterograft
   d. Xenograft

20. An example of a type III immune complex disease is
   a. Contact dermatitis
   b. Serum sickness
   c. Atopy
   d. Allergies

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