**SET A**

# M.Sc. BIOTECHNOLOGY
## SECOND SEMESTER
## IMMUNOLOGY
## MBT-202
**[USE OMR SHEET FOR OBJECTIVE PART]**

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

**Objective**

**Time: 30 mins.** **Marks: 20**

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

1. The concept of attenuation was developed in context to:
   a. Less production of microbial cells
   b. Lessening of infectivity of the microbes
   c. Microbes becoming in active
   d. All of them

2. How skin fails to protect us from microbial invasion?
   a. Acne
   b. Hair follicles
   c. Insect bites
   d. Salivary amylase

3. Plasma therapy does include:
   a. Oral vaccine
   b. Transfer of preformed antibodies
   c. Transcytosis of antibodies
   d. All of the above except b

4. Activation of dendritic cells depend upon:
   a. Interaction with antigen
   b. Interaction with antigen-MHC class II
   c. Cytokines secreted by $T_H$ cells
   d. Mediators

5. Which of the following is NOT true for Follicular Dendritic cells?
   a. They are found in Follicles
   b. They have receptors for Abs
   c. Activates $T_H$ cells
   d. Non-phagocytic cell

6. Secondary follicles are NOT found in the following:
   a. Tonsils
   b. Payer's patch
   c. Medulla of Thymus
   d. Marginal zone

7. The following damage cells by releasing histamine:
   a. Macrophages
   b. Neutrophils
   c. Only a and b
   d. Mast cells

8. Positive selection in thymus is to remove:
   a. T cells acting against grafts
   b. T cells acting against self-components
   c. T cells acting against BSA
   d. T cells against T cells from another individual

9. Receptor for antibody binding on the surface of basophils is specifically for:
   a. IgG
   b. IgM
   c. IgA
   d. None of the above

10. Which of the following statement is true?
    a. Steroids are haptens
    b. Adjuvants increases immunogenicity
    c. Epitopes and antigenic determinants are synonyms
    d. None of the above

11. Why IgE has an extra domain in its structure?
    a. Question is wrong
    b. Because of extra amino acids
    c. Because of an extra β sheets
    d. Because of intrachain disulphide bond

12. Secretory component in IgA is derived from a pathway called:
    a. Opsonization
    b. Receptor mediated endocytosis
    c. ADCC
    d. Phagocytosis

13. Which of the following does not explain antibody structure?
    a. 2 β pleated sheets with antiparallel β strands
    b. Variable domain of 110 amino acids
    c. Domain stabilized by intrachain disulphide linkage
    d. Hydrophobic bonds inside the antibody structure

14. Properdin increases the half-life of:
    a. C5b6
    b. C4b2b
    c. C3bBb
    d. C3bBb3b

15. C5 convertase initiates:
    a. Opsonization
    b. Viral neutralization
    c. Smooth muscle contraction
    d. MAC formation

16. Which of the following does not explain prozone effect?
    a. Antibodies which cannot bind to antigens
    b. Antibodies which are univalent
    c. Antibodies which are more than antigens
    d. Antigens which are polyvalent

17. How results are analysed in immunoelectrophoresis?
    a. Presence or absence of absence of antibodies
    b. Presence or absence of absence of antigens
    c. Analysis of precipitation arcs
    d. None of the above

18. Reason for less duration needed for graft rejection in secondary response is due to:
    a. Production of memory cells during primary response
    b. Necrosis taking place in a single day
    c. No vascularization
    d. Vascularization occurring in a single day

19. How C5b of complement activation is involved in type opsonization?
    a. Upregulation of CR
    b. Increase in the generation of C3b
    c. Downregulation of CR
    d. Increase production of Abs

20. Which of the following antigens – TSTA or TATA belong to a normal cell at a particular stage of development?
    a. Tumor cell
    b. Fetal cell
    c. Adult cell
    d. All of the above

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## Descriptive

**Time : 2 hr. 30 mins.** **Marks : 50**

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

1. What is the meaning of the term "attenuation" and what is the significance of the term in the field of vaccination? Explain how the mucus membranes of our body protect us from invading microbes. What is the role of memory cells in vaccination? Give reason for your answer. Expand non specificity of adaptive immunity. What is the role of chemical mediators during inflammatory responses? 2+3+2+1+2=10

2. Explain the mechanism of protection to invading microbes by our intestine with a neat diagram. What is the mechanism of neutralization of infection in spleen? Explain the process and give the importance of germinal center in the process. What are the similarities in action between macrophages and neutrophils? Justify your answer. Write in brief the activity of an active dendritic cell. 2+4+2+2=10

3. Explain the structure of antibodies with help of IgG and write about its function. An individual was transfused for the first time with blood A when his blood type was B leading to its immediate rejection. Explain how an immediate response occurred. Explain how preformed antibodies against blood group antigens are produced in an individual. How is hematopoiesis leading to formation of blood is regulated? Explain the activity of an active dendritic cell. 3+2+2+1+2=10

4. Explain how to increase the immunogenicity of hCG hormone. How maternal antibodies give protection to the fetus? Explain it in your own language. What was the use of discovery of multiple myeloma in antibody sequencing? What are the findings of H-chain sequencing? Give reasons why some vaccines use adjuvants. According to you which class of MHC is important to activate immune response? Justify your answer. 2+1+1+2+2+2 =10

5. Explain the structure of MHC II molecules with a neat diagram. What is the importance of expression of class I MHC molecules during an immune response against virus infection? What determines the strength of antigen-antibody interaction? Justify your answer. Is there any use of immune response in detection of pregnancy using home pregnancy test kit? Give your justification. Interpret the precipitation curve with a diagram. 3+2+1+2+2=10

6. What is the importance of alternative pathway of complement activation? Explain the mechanism. Is there any relation between SLE and C3b? Justify your answer. Explain the use of C5 convertase in eliminating bacterial cells. Can u suggest two therapies to prevent rejection of grafts after transplantation? What is the difference between TATA and TSTA? 2+2+3+2+1=10

7. How can you perform precipitation in fluids? Explain the mechanism. What is the use of rocket electrophoresis in the field of clinical diagnosis? Explain with the help of the process. How will you interpret the results of competitive ELISA? A patient was infected with Streptococcus. How will you determine the amount of the bacteria in solution? Explain the process. 2+2+4+2=10

8. A patient was complaining about joint pains with swelling. Which type of hypersensitivity is responsible for this affliction? Explain the mechanism. How do you think antibodies responsible for Asthma? Justify your answer with the mechanism. Is there any relation between type IV hypersensitivity and TB? Justify your answer with reasons. What is the importance of $Ca^{2+}$ ions in degranulation of basophils and mast cells? Explain pernicious anemia. 3+2+2+2+1=10

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