REV-01
BBT/32/37

2022/07

# B. Sc. BIOTECHNOLOGY
## FOURTH SEMESTER
## IMMUNOLOGY
## BBT – 402

( 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:** **1X20=20**

1. The concept of vaccination was developed by
   a. Louis Pasteur
   b. Edward Jenner
   c. Carl Landsteiner
   d. All of them

2. Which of the following statements are TRUE regarding adaptive immunity?
   a. Prior exposure to antigen is essential
   b. Prior exposure to antigen is not essential
   c. It is a non-specific defence mechanism
   d. Macrophages are the major cells involved

3. T cell surface receptors partly recognize
   a. Antibody
   b. MHC
   c. Fc Receptor
   d. Both (b) and (c)

4. Phagocytic cells include all EXCEPT
   a. Neutrophil
   b. Mast cells
   c. Basophils
   d. Both (b) and (c)

5. Germinal center is present within
   a. Primary follicles
   b. Secondary follicles
   c. Lymph nodes
   d. Payer's patch

6. Which of the following statement is true?
   a. All immunogens are antigens but all antigens are not immunogen
   b. All immunogen are antigen and all antigen are immunogen
   c. All immunogens are not antigens and all antigens are immunogens
   d. None of the above

7. α3/β2 domains of MHC class II molecule is made up of
   a. α helix
   b. β pleated sheets
   c. 2 regions of α helix with a platform of antiparallel β strands
   d. β pleated sheets with parallel β strands

8. Examples of Agglutination reaction does NOT include
   a. Bacterial agglutination
   b. Blood typing
   c. Hemagglutination
   d. Rocket Immunoelectrophoresis

9. Class II MHC molecules are presents on the surface of cells EXCEPT
   a. Macrophages
   b. Neutrophils

c. Interdigitating dendritic cells
d. B cells

10. Antigenic determinants found in the C region of an antibody molecule in only few members of a species is called
a. Isotype
b. Allotype
c. Idiotype
d. All of the above

11. Which of the following is the example of type III hypersensitive reaction?
a. Meningitis
b. Vasculitis
c. Rheumatoid arthritis and Arthus reaction
d. All of the above

12. A child stung by a bee experiences respiratory distress within minutes and lapses into unconsciousness. This reaction is probably mediated by
a. IgG antibody
b. IgE antibody
c. Sensitized T cells
d. None of the above.

13. Grave's disease is also called as and is caused due to
a. Hypothyroidism, T cells
b. Hyperthyroidism, autoantibodies
c. Goiter, macrophages
d. All on the above

14. Erythroblastosis fetalis is a fatal condition when
a. Fetus is Rh negative and mother is Rh negative
b. Fetus is Rh positive and mother is Rh positive
c. Fetus is Rh positive and Mother is Rh negative
d. None of the above

15. The en product of each of the activation method of complement system is/are
a. C5 convertase
b. C3 Convertase
c. MAC
d. Both (a) and (b)

16. The technique where antiserum is added in the molten agarose is
a. Single radial immunodiffusion
b. Immunoelectrophoresis
c. Ouchterlony double diffusion
d. All of the above

17. Difference between ELISA and RIA is
a. Radio active elements are used in both
b. No radioactive elements are used
c. Enzyme is used in ELISA and radioactive elements in RIA
d. Enzyme is used in both

18. Complete rejection of an allograft occurs in
a. 1-5 days
b. 12-14 days
c. 7-10 days
d. 14-20 days

19. Mixed lymphocyte reaction for HLA typing is used for
a. Compatibility of class I MHC molecules between donor and recipient
b. Compatibility of blood groups between donor and recipient
c. Compatibility of WBC between donor and recipient
d. Compatibility of class II MHC molecules between donor and recipient

20. If two tissues are histoincompatible, it leads to

a. Rejection of the transplanted organ

b. Transplanted organ is accepted by the recipient

c. It is accepted at first and then rejected

d. None of the above

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## PART-B : Descriptive

Time : 2 hrs. 40 min. Marks : 50

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

1. What are the branches of immune system? Do you think activation of TH cells depends on macrophages? Justify your answer. Differentiate between innate and adaptive immunity. What are attenuated vaccines? 2+3+4+1=10

2. Why secondary lymphoid organs are important? What are the similarities of mode of action of neutrophils and macrophages? Explain. What is the mechanism of ADCC? Write about the structure and function of thymus. 2+3+2+3=10

3. Explain in brief why small and insoluble molecules are antigenic and not immunogenic. How can we make them immunogenic? Explain adjuvants. How can we increase the efficacy of vaccines using adjuvants? Add yours ideas. Explain in brief how IgM is more effective than IgG. How cytokines functions though cascade induction? 3+4+2+1=10

4. Explain avidity and how it determines strength of antigen-antibody interaction? Explain cross reactivity with the help of an example. Explain how MHC genes are related to transplantation. Write the gene location that codes for class I MHC molecules. Write about the findings of H-chain sequencing. 2+3+2+1+2+=10

5. Explain the process of classical pathway of complement activation. What is opsonization and how complement components are involved in immune complex clearance. Define atopy and degranulation. Explain in brief asthma, a disease related to type I hypersensitivity. 3+2+2+3=10

6. Define DTH. What are the manifestations of types III hypersensitive reactions? What are the mechanisms by which immune systems effects the cells/tissues of our body? Explain them. Write in brief about hemolysis due to blood group incompatibilities. 1+3+3+3=10

7. What are the different types of transplants? What do you think is the major reason for graft rejection? Explain in brief. What are the tests done before organ transplantation? Write about RIA. Why it became unpopular? 2+3+2+2+1=10

8. Interpret the precipitation reaction curve. What is the difference between SRID and ODD? Explain how rocket immunoelectrophoresis can be used as a diagnostic procedure. How can we interpret the result of competitive ELISA? 3+2+3+2=10