

[6]

- b) What are clonal anergy of T cells? Why such cells can not be reactivated. 2+3
- c) Briefly discuss the function of Th1, Th2, and Th17 cells. 6
8. a) List the roles of complement in immune defence. 6
- b) The uncontrolled activation of complement is deleterious. How is complement activity regulated normally? 6
- c) Which complement product is Anaphylatoxin? Describe its function? 4
9. a) Enumerate Hypersensitivity reaction and discuss briefly about Type 4 Hypersensitivity reaction. 3+4
- b) Discuss the mechanisms of anaphylaxis. 4
- c) What is serum sickness? Why it is accompanied by hypocomplementemia? 2+3)
10. a) NK cell has no immunogenic memory though it is first line of defence explain. 4
- b) Discuss briefly how Nk cell recognize infected cells? 6
- c) How cytotoxic T cell is activated by hepler T cells. 4
11. a) Why is immune tolerance important for survival of the individual? 5
- b) How tumor specific transplantation antigen can be isolated.

Ex/MSBT/1/4/53/2019

M. Sc. BIO-TECHNOLOGY PART I EXAMINATION, 2019

IMMUNOLOGY

PAPER - MSBT 1/4

Time : Four hours

Full Marks : 100

PART - I

Answer *any one* question :

16

1. a) Define immune system.
- b) What do you mean by imminocompetent cells?
- c) Which immune cell generates NETS? How does it help in the immune action of that cell?
- d) What are the primary or central immune organs?
- e) Describe the histological structure of thymus.
- f) What is blood thymus barrier? [2+2+1+2+2+5+2]
2. a) Describe very briefly the mechanism of inflammation.
- b) What purpose the inflammation serves in immune protection?
- c) "All pathogens are antigens, but not all antigens are pathogens."—is it so? Why?

[Turn over

[2]

- d) Define fever. What is its relation with immune reaction ?
- e) What do you mean by immunocompetent, naïve and activated T and B cells? [4+2+2+2+2+4]

PART - II

Answer question 3 and *four* from the rest :

$$20+4\times 16=84$$

- 3.
- i) Which Cytokine has chemotactic factors ?
 - ii) How do antimicrobial peptides AMP's work ?
 - iii) Name the immune cell which has highly developed rough endoplasmic reticulum.
 - iv) Where in the antibody Ig idiotypes are found.
 - v) Name the mechanism by which a B-cell is able to make cell-surface and secreted versions of antibody .
 - vi) N-region insertion in antibody is associated with the expression of which enzyme.
 - vii) A positive tuberculin test is an example of which type of hypersensitivity?
 - viii) Name the TCR chains which contain D-segments, similar to immunoglobulin heavy chains ?

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- ix) Name the disease most frequently seen in association with pernicious anemia.
- x) What happens when a resting naïve T-cell engages its specific MHC/peptide complex displayed on the surface of a fibroblast.
- xi) Which medium is used to select the hybrids in the hybridoma technique.
- xii) Which immune cell is responsible for the quickest release of histamine that causes the red itchy welts associated with allergies ?
- xiii) With the help of which molecules Naïve CD4+ T cells become T1 helper T cells.
- xiv) In a mouse model for a human disease, the activation-induced cytidine deaminase (AID) gene is knocked out (deleted). Which antibody response in that animal will be observed ?
- xv) To prevent graft rejection of transplanted solid organs, a researcher decided to work on a method to reduce MHC expression on the foreign cells. This strategy, however, would leave the transplanted cells more susceptible to attack by which cells ?

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- xvi) Patients suffering from toxic shock syndrome are found to have which of the following as the causative mechanism ?
- xvii) Some tumor cell characteristically re-express antigens found only early in normal development of that cell type. Give an example of this protein/tumor pair.
- xviii) Which agent is responsible for the development of tumors in immunosuppressed patients.
- xix) Without CD40L-CD40 interaction, B lineage cells fail to respond properly, why ?
- xx) A child with a sore throat is tested for anti streptococcal antibody to see if the infection is due to this bacterium. The child is found to have only IgG antibodies to this organism with no detectable IgM. Explain the observation.
4. a) How different immune cells are produced from Myeloid stem cells ? Outline the main function of eosinophil ?
(3+4)
- b) What are the characteristics of immunogenicity? 2
- c) Compare mast cells and basophils, similarities and differences. 4

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- d) Compare and contrast the key features of recognition receptors in the innate and adaptive immune systems. 3
5. a) Differentiate between isotype, allotype and idiotype variation of antibody. 4
- b) Describe the processes involved in the generation of antibody diversity. You may use annotated diagrams in your answer if you wish. 6
- c) Describe the mechanism of Immunoglobulin class switching, illustrating your answer with examples of the failure of these processes in man. 6
6. a) Compare the functions of MHC class I and class II molecules.
5
- b) Dendritic cells are most professional antigen presenting cells" explain. 4
- c) Mention endocytic pathway for antigen presentation. 7
7. a) Describe the signaling pathway associated with T cell activation.
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