

M.Sc. BIOTECHNOLOGY
Third Semester
IMMUNOLOGY
(MBT - 302)

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 four from Question no. 2 to 8
Question no. 1 is compulsory.

1. What do you mean by grafting? Discuss the immunological process of allograft rejection. (10)
2. Mention the major immunological functions triggered by the complement system. Give diagrammatic description of the alternative pathway of complement activation. (4+6=10)
3. Write the statements of Burnett's "Clonal Selection" theory. Discuss briefly the process of monoclonal antibody production. (4+6=10)
4. Define inflammation. Give a diagrammatic description of the process of phagocytosis. (2+8=10)
5. What is an adjuvant? What are the major functions of an adjuvant? Write the structural and functional differences between Class-I and Class-II MHC molecule. (2+4+4=10)
6. What is the basic difference between primary and secondary lymphoid organs? Discuss the immunological functions of secondary lymphoid organs. (2+8=10)
7. Write the functional properties of cytokines. Discuss briefly the process of signal transduction by cytokines. (5+5=10)

Or

Define agglutination. Discuss the major steps of this reaction. How this reaction process differs from precipitation. (2+5+3=10)

8. What do you mean by hematopoiesis? Draw a labelled diagram showing the formation of blood cells from an HSC. (2+8=10)

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Duration: 20 minutes

Marks – 20

(PART A - Objective Type)

I. Choose the correct answer:

1×15=15

1. Coating of an antigen onto the surface of carrier particles is the basic principle of _____.
a) Active (direct) agglutination b) Passive (Indirect) agglutination
c) Reverse Passive agglutination d) Hem agglutination
2. Numerous antibodies can be prepared, against one antigen, each bind to unique epitopes. This antibody diversity is generated by _____.
a) By rearrangements of the DNA encoding the variable regions of the heavy and light chains.
b) By the combination of different heavy and light chains that form the antigen binding site.
c) Antibody proteins can physically change their shape to bind different epitopes.
d) Both (a) and (b).
3. Major Histo Compatibility Complex (MHC) is a collection of genes arrayed on _____.
a) chromosome 21 in man, chromosome 6 in mice
b) chromosome 6 in man, chromosome 21 in mice
c) chromosome 17 in man, chromosome 6 in mice
d) chromosome 6 in man, chromosome 17 in mice
4. CD8 surface antigen is present in _____.
a) cytotoxic T cells b) suppressor T cells
c) helper T cells d) both (a) and (b)
5. _____, an autoimmune disorder where auto-antibodies are produced against vast array of antigens.
a) Grave's disease b) Myasthenia Gravis
c) Systemic Lupus Erythematosus d) all of the above
6. T cell receptors (or TCR) on CD4+ T cells _____.
a) recognize peptides not associated with MHC molecules.
b) recognize peptides associated with MHC class I molecules.
c) recognize peptides associated with MHC class II molecules.
d) are secreted out into the environment to bind antigens.
7. Among the following(s) _____ is/are the determinants of antigenicity?
a) Chemical nature b) Size of the antigen
c) Foreignness d) All of these

8. Among the following statements _____ is false regarding B cells.
- B cells can undergo class switching and produce a different antibody type.
 - B one marrow stem cells migrate to the thymus and develop into B cells.
 - B cells synthesize antibodies and put them on their cell surface.
 - B cells that recognize high concentrations of antigens (self) in the absence of other signals undergo apoptosis in the Bone marrow.
9. Lysozyme is present in _____
- sweat
 - Cerebro spinal fluid (CSF)
 - urine
 - saliva
10. Cytokines secreted by some leukocytes that act upon other leukocytes are known as _____.
- chemokines
 - interleukins
 - monokines
 - lymphokines
11. The major cardinal sign (s) of inflammation include _____.
- rubor
 - calor
 - dolor
 - all of the above
12. Allergic Rhinitis is a clinical manifestation of _____ hypersensitivity reaction.
- Type I
 - Type II
 - Type III
 - Type IV
13. A particular cytokine bound to receptors on a target cell in close proximity to the producer cell, exhibits _____ action.
- autocrine
 - paracrine
 - endocrine
 - all of the above
14. Class I MHC molecules in human are uncoded by _____.
- K and D
 - A, B, C
 - DP, DQ, DR
 - all of the above
15. Specific immunity exhibits four characteristic attributes mediated by lymphocytes, excluding _____.
- Diversity
 - Immunological memory
 - Self and none self-recognition
 - Margination

II. Match Column A with Column B:

1×5=5

Column A

Column B

- | | |
|-------------------|---|
| 1) Cb5-9 | i. Hematopoiesis stimulators |
| 2) Dendritic cell | ii. Membrane attack complex (MAC) |
| 3) Diapedesis | iii. Antigen presenting |
| 4) C1 inhibitor | iv. Phagocytotic migration |
| 5) IL-3 and IL-7 | v. Classical pathway of complement activation |
