

IMMUNOLOGY
(BIOT 3201)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

- (i) The association constant (K_a) at equilibrium is represented by
(a) $\frac{[\text{AgAb complex}]}{[\text{free Ag}][\text{free Ab}]}$ (b) $\frac{[\text{AgAb complex}]}{[\text{free Ag}]/[\text{free Ab}]}$
(c) $\frac{[\text{free Ag}][\text{free Ab}]}{[\text{AgAb complex}]}$ (d) $\frac{[\text{free Ag}]}{[\text{free Ab}]}$.
- (ii) B Cells are activated by
(a) Complement (b) Antibody
(c) Memory cells (d) Antigen.
- (iii) The membrane attack complex consists of
(a) OH (b) Collicins
(c) C3b3b, Bb (d) C5b,6,7,8,9.
- (iv) Clonal selection occurs when antigen is encountered by
(a) Neutrophils (b) T cells
(c) Mast cells (d) Basophils.
- (v) The complementarity determining regions
(a) are restricted to light chains
(b) are in the constant part of the Ig molecule
(c) Bind to Fc receptors
(d) Are concerned in antigen recognition.
- (vi) Which of the gene clusters do not contribute to antigen binding?
(a) V_L (b) C_L
(c) V_H (d) D.
- (vii) In primary immune response, antibodies rise in plasma level within
(a) 10 days (b) 12 days
(c) 7 days (d) 15 days.

- (viii) BCG is used to protect against
(a) Tuberculosis (b) Rabies
(c) Influenza (d) Hepatitis B.
- (ix) Type IV hypersensitivity is often referred to as
(a) Immediate (b) Delayed
(c) Anaphylactic (d) Anergic.
- (x) The major molecules responsible for transplant rejection is
(a) B cells (b) MHC molecules
(c) T cells (d) Antibodies.

Group – B

2. (a) What are the major features of adaptive immunity? Discuss the mode of action of NK cells.
(b) Illustrate the process of alternate complement pathway with a diagram.
 $(2 + 4) + 6 = 12$

3. (a) Differentiate between Helper T cell and Cytotoxic T cell.
(b) Explain the process of Thymic Education with a diagram.
 $6 + 6 = 12$

Group – C

4. (a) How can the same antibody exist both in secretory as well as membrane-bound forms?
(b) Explain how a B cell is able to switch between different isotypes.
(c) Discuss the importance of 12-23 rule in antibody gene rearrangement.
 $4 + 4 + 4 = 12$
5. (a) Illustrate the structure of a typical antibody molecule.
(b) What do you mean by chimeric immunotoxins?
(c) Give a comparative analysis of indirect, competitive and sandwich ELISA.
 $4 + 2 + 6 = 12$

Group – D

6. (a) Illustrate the antigen processing and presentation by MHC Class-I molecules.
(b) Analyse the immunological basis of blood group detection in a laboratory.
(c) What is tissue typing?
 $5 + 4 + 3 = 12$

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7. (a) Define: Autograft, Xenograft, Isograft, Allograft
(b) Discuss the role of HLA molecules in transplant rejection.
(c) Explain the basis of a cross-matching test?

4 + 4 + 4 = 12

Group – E

8. (a) What do you mean by clonal anergy?
(b) Describe the mechanism of central tolerance.
(c) Illustrate the mechanism of Hemolytic Disease of the Newborn.

2 + 5 + 5 = 12

9. (a) What do you mean by active and passive immunization? Give examples.
(b) Site an example how you can use cytokines for cancer immunotherapy.
(c) What are subunit vaccines? Give an example.

4 + 3 + (4 + 1) = 12

Department & Section	Submission Link
BT	https://classroom.google.com/c/MzE1ODY1NTA2NzMy/a/MzM5ODUxNjY3NDAY/details