



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (BT)/SEM-5/BT-501/2010-11

2010-11

IMMUNOLOGY

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

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

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

- i) Which category of hypersensitivity best describes hemolytic disease of the newborn caused by Rh incompatibility ?
- a) Atopic or anaphylactic b) Cytotoxic
c) Immune complex d) Delayed.
- ii) C3 is cleaved to form C3a and C3b by C3 convertase. C3b is involved in all of the following *except*
- a) altering vascular permeability
b) promoting phagocytosis
c) forming alternative pathway C3 convertase
d) forming C5 convertase.



iii) Which class of antibody if run on reducing gel gives rise highest number of bands ?

- a) IgG
- b) IgM
- c) IgD
- d) IgA.

iv) Bone marrow transplantation in immunocompromised patients presents which major problem ?

- a) Potentially lethal graft-versus-host disease
- b) High risk of T cell leukemia
- c) Inability to use a live donor
- d) Delayed hypersensitivity.

v) AIDS is caused by a human retrovirus that kills

- a) B lymphocytes
- b) lymphocyte stem cells
- c) CD4-positive T lymphocytes
- d) CD8-positive T lymphocytes.

vi) After binding to its specific antigen, a B lymphocyte may switch its

- a) immunoglobulin light chain isotype
- b) immunoglobulin heavy chain class
- c) variable region of the immunoglobulin heavy chain
- d) constant region of the immunoglobulin light chain.



vii) "Isotype switching" of immunoglobulin classes by B cells involves

- a) simultaneous insertion of VH genes adjacent to each CH gene
- b) successive insertion of a single VH gene adjacent to different CH genes
- c) activation of homologous genes on chromosome 6
- d) switching of light chain types (kappa and lamdba).

viii) A primary immune response in an adult human requires approximately how much time to produce detectable antibody levels in the blood ?

- a) 12 hours
- b) 3 days
- c) 1 week
- d) 3 weeks.

ix) The membranes IgM and IgD on the surface of an individual B cell

- a) have identical heavy chains but different light chains
- b) are identical except for their CH regions
- c) are identical except for their VH regions
- d) have different VH and VL regions.



- x) An antibody directed against the idiotypic determinants of human IgG antibody would react with
- a) the Fc part of the IgG
 - b) an IgM antibody produced by the same plasma cell that produced that IgG
 - c) all human kappa chains
 - d) all human gamma chains.
- xi) An Rh-negative woman married to a heterozygous Rh-positive man has three children. The probability that all three of their children are Rh-positive is
- a) 1 : 2
 - b) 1 : 4
 - c) 1 : 8
 - d) zero.
- xii) The structural basis of blood group A and B antigen specificity is
- a) a single terminal sugar residue
 - b) a single terminal amino acid
 - c) multiple differences in the carbohydrate portion
 - d) multiple differences in the protein portion.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What is anaphylaxis ? What is its experimental basis ? What is allelic exclusion ? What is haplotype inheritance ?
 $1 + 2 + 1 + 1$
3. Compare between humoral and cell mediated immunities ? Give one example each of passive natural and active artificial immunities.
 $3 + 2$
4. Explain the different factors of innate immunity. What is tonsil ?
 $3 + 2$
5. What is nurse cell ? What is the difference between idiotype and allotype ? What is hapten ? What is MLR ? $1 + 2 + 1 + 1$
6. Explain the role of HLA-DM/DO interaction in the loading of peptides to MHC. Name the factors that determine the immunogenic potential of an antigen. How does adjuvant augment the antigenicity of an antigen ? $2 + 1 + 2$



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. How does aspirin relieve us from asthma ? What is the difference between asthma and allergy ? What are the factors that induce tolerance ? Explain tolerance in terms of clonal allergy. Why are gram positive bacteria resistant to complement mediated lysis ? What is septic shock ?

$3 + 3 + 2 + 2 + 2 + 3$

8. Compare between classical pathway and alternative pathway of complement activation. Discuss some advantages and disadvantages with live versus killed polio vaccines. Write on pathogenesis of Myasthenia Gravis. What is indirect comb test ? What are the causes of SCID ?

$5 + 2 + 3 + 2 + 3$

9. What is NSAID ? Compare between primary and secondary immune responses. How do you explain that graft rejection is attributed to delayed type of hypersensitivity ? How does immunosuppressive drug work ? What is rhogam ? Compare between polyclonal and monoclonal antibodies.

$2 + 3 + 3 + 2 + 2 + 3$



10. How is sandwich ELISA performed ? Why is secondary antibody used in ELISA ? What is immunotoxin ? How is the structure of antibody established ? How do you explain the co-expression of IgG and IgM ? 4 + 2 + 2 + 4 + 3

11. What are thymus dependent and thymus independent antigens ? What are antigenic drift and antigenic shift ? What is conjugate vaccine ? Name some tumor antigens. What is ISCOM ? Jerry is a virologist studying the effects of swine influenza virus (SIV) on the immune system in pigs. Jerry got sloppy and did not use all the right precautions when handling the SIV and became sick, but recovered after about two weeks. Two weeks later Jerry was back at work and once again exposed himself to the SIV, however this time he did not get nearly as sick as the first time. Explain using words and diagrams the immunological reason for this phenomenon. What are the difficulties to establish suitable antidote against AIDS ? 2 + 2 + 2 + 2 + 1 + 4 + 2
