



Name :
Roll No. :
Invigilator's Signature :

CS/B.TECH(BT)/SEM-5/BT-501/2011-12

2011

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) are responsible for the production of antibody against free pathogens and soluble products from pathogens while destroy pathogen and virally infected cells and abnormal cells.
- a) Tc cells, B cells b) Macrophages, T cells
c) B cells, Th cells d) B cells, Tc cells.
- ii) Which of the following is not a characteristic of IgG ?
- a) Its L chains are either κ or λ
b) It is the largest of all the Igs
c) It is the predominant Ig in peritoneal fluid
d) It crosses the placenta.



- iii) A positive skin reaction to tuberculin means that one has
 - a) an active case of tuberculosis
 - b) antibodies specific for tuberculosis
 - c) memory CD4 *T* cells specific for tuberculosis
 - d) an allergy to tuberculosis.
- iv) Bacterial polysaccharide vaccines are conjugated to proteins so that
 - a) the polysaccharide can act as an adjuvant
 - b) the protein can stimulate *T* cell help
 - c) the protein can act as an adjuvant
 - d) the protein makes the polysaccharide immunogenic.
- v) The lack of an immune response to self is called
 - a) tolerance
 - b) negative selection
 - c) anergy
 - d) autoimmunity.
- vi) Immunoglobulin isotype is determined by the
 - a) *H* chain constant region
 - b) *L* chain variable region
 - c) number of antigen-binding sites
 - d) number of *VH* domains.
- vii) Alum is an effective adjuvant because it
 - a) disaggregates the antigen
 - b) slows the release of antigen
 - c) is immunogenic for *T* cells
 - d) makes a hapten immunogenic.
- viii) Lymphocytes are activated by antigen in the
 - a) blood stream
 - b) lymph nodes
 - c) bone marrow
 - d) all of these.
- ix) CD antigens
 - a) function as receptors for cytokine
 - b) are expressed on immune cells
 - c) allow leukocytes to recognize antigen
 - d) are found only on leukocytes.



- x) The alternative pathway of complement activation
 - a) occurs after the classic pathway is activated
 - b) requires C4
 - c) occurs only if the classical pathway is ineffective
 - d) requires C3.
- xi) An immediate allergic mediator released by mast cells is
 - a) *IgE*
 - b) Histamine
 - c) Prostaglandin
 - d) Epinephrine.
- xii) Both Class I and Class II MHC molecules are
 - a) expressed on the *B* cell membrane
 - b) composed of *a* and *b* chains
 - c) part of the *T* cell receptor for antigen
 - d) expressed constitutively on all cells.

GROUP – B

(Short Answer Type Questions)

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

2. What is allelic exclusion ? How does adjuvant augment the antigenicity of an antigen ? Explain the role of HLA-DM/DO interaction in the loading of peptides to MHC. $1 + 2 + 2$
3. What is the use of secondary antibody ? Cell grown in cholesterol rich medium shows better antigen presentation, explain. What do you mean by haplotype inheritance ? $2 + 2 + 1$
4. In an immunology laboratory exercise, you are studying the response of mice injected intradermally with complete antibodies to the *IgE Fc* receptor (*Fc* ϵ R1) or with *Fab* fragments of such antibodies.
 - a) Predict the response expected with each type of antibody
 - b) Would the responses observe depend on whether the mice were allergic ? Explain. What are syngenic mice ? $2 + 2 + 1$
5. "Autoimmunity leads to the formation of immune complex in the joints leading to Rheumatoid arthritis." Explain.
6. Differentiate between helper *T* cells and cytotoxic *T* cells.



GROUP – C

(Long Answer Type Questions)

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

7. a) What do you mean by Memory cells ? 2
 b) Explain with diagram the process of Thymic Education. 5
 c) Discuss the rationale behind the use of HAT medium in hybridoma technology. 5
 d) Discuss the mode of action of Natural Killer cells. 3
8. a) Distinguish between the structural features of MHC-1 and MHC-2. 3
 b) Explain the endocytic pathway of antigen processing and presentation. 4
 c) Discuss the role of recombination signal sequences in V-D-J joining during somatic hypermutation. 4
 d) What do you mean by Immunogen and Hapten ? 2 + 2
9. Write short notes on any *three* of the following : 3 × 5
 a) Radio immunoassay
 b) DNA vaccine
 c) Antibody affinity and antibody avidity
 d) Class switching
 e) Immediate hypersensitivity.
10. a) Define the following : 4 × 1
 Isograft, Allograft, Xenograft, Autograft.
 b) Discuss the role of helper T cells in graft rejection. 5
 c) Discuss briefly the principle of HLA typing. 2
 d) Write a short account on Graft Versus Host Disease. (GVHD). 4
11. Summarize the harmful and protective sides of immediate hypersensitivity. How does allergen cause degranulation of mast cell ? What is peripheral tolerance ? What is indirect comb test ? What are the uses of polyclonal antibody ? Compare between idiotype and allotype. What is the principle of DNA vaccine ? 2 + 3 + 2 + 2 + 2 + 2 + 2

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