Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech (BT)/SEM-2/MBT-202/2013

2013

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 the following : 10 × 1 = 10

   i) Which of the following is most likely to induce a strong immune response ?

   a) Glycoprotein b) Phospholipid

   c) Glycolipid d) Nucleic acid.

   ii) Bacteria are cleared from bloodstream mainly by

   a) Lung capillaries

   b) Spleen and liver macrophages

   c) Circulating neutrophils

   d) Marginating neutrophils.

iii) Proteasomes play a key role in processing

a) Exogeneous antigens

b) Bacterial antigens

c) Cell surface antigens

d) Endogeneous antigens.

iv) *B* lymphocytes in the spleen are largely found in the

a) Marginal zone

b) Red pulp

c) Periarteriolar lymphoid sheath

d) Follicular areas.

v) The hinge region of an antibody is flexible because it contains a large amount of which amino acid ?

a) Serine b) Cysteine

c) Theronine d) Proline.

vi) The only two Ig classes that can be expressed simultaneously on a *B* cell surface are

a) IgM and IgG b) IgA and IgG

c) IgG and IgD d) IgM and IgD.

vii) The chemical typically released in type I hypersensitivity is

a) IL 4 b) IgG

c) Histamine d) Arachidonic acid.

viii) ABO blood group is determined by

a) different carbohydrate residues on RBC membranes

b) different peptides on RBC membranes

c) different lipids of RBC membrane

d) both different carbohydrate and protein residues on RBC membrane.

ix) Hashimoto's thyroiditis is an example of

a) immunity disorder due to microbial infection

b) hypersensitivity reaction

c) autoimmune disease

d) viral infection.

x) Adjuvants are used for production of

a) non-living vaccines

b) live vaccines

c) recombinant DNA vaccine

d) peptide vaccine.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Explain the role of external physical barriers against pathogen attack.

3. Describe the basic structure and function of bone marrow and spleen.

4. Discuss the MHC Class-II peptide interaction leading to antibody secretion.

5. What is hapten ? Discuss its role in contact dermatits.

6. Discuss the use of toxins and toxoids for preparation of vaccines.

7. What is molecular mimicry ? Discuss its role in autoimmune diseases.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. a) What is a super-antigen ?

   b) Define clonal abortion.

   c) Discuss the mechanism of a bacterium bypassing the immune system.

   d) What are the roles of Interferons during a viral infection ?

   e) Briefly describe the initiation phase of Lectin-dependent complement activation.

   f) Discuss the action of Pepsin and Papain on antibody structure. 2 + 1 + 3 + 3 + 3 + 3

9. a) IgM is present in the body both as secretory and membrane-bound forms. Explain the mechanism behind the phenomenon.

   b) Explain the formation of kappa light chain by the somatic hypermutation process.

   c) What are the forces acting on antigen-antibody interactions ?

   d) Define : Affinity, Avidity. 5 + 5 + 3 + 2

10. a) What are the tumour-specific antigens and tumour associated antigens ? Give examples.

    b) How do cancer cells escape from the immune-surveillance ?

    c) What is the utility of tumour vaccines in active immunotherapy ?

    d) Discuss the different aspects of cytokine therapy in the field of cancer therapeutics. 5 + 5 + 2 + 3

11. Mrs. Smith has blood Group O, Rh negative and Mr. Smith has blood group A, Rh positive. They have three children of which two are affected by hemolytic disease of new born (HDNB). The history is as follows :

1st Child : Unaffected (blood group O +)

2nd Child : mildly affected (blood group A +)

3rd child : seriously affected, needed blood transfusion (blood group A +)

Mrs. Smith was given antibodies to Rh factor after the third delivery. With the above information, answer the following :

a) Why was the first child unaffected ?

b) Why was the third child more affected than the second child ?

c) Why was Mrs. Smith given antibodies to Rh factor ?

5 + 5 + 5

12. a) Discuss the role of Langerhans cell and keratinocytes in contact dermatitis.

b) What are the causes of granulomatous hypersensitivity ? Discuss how giant cells are formed in granuloma. 4 + 4 + 2 + 5

13. a) What is thymic education ? Describe the process.

b) What is peripheral tolerance ? Discuss the role of activation induced cell death (AICD) and programmed cell death (PCD) in development of peripheral tolerance. 2 + 5 + 2 + 3 + 3