xName : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech(BT)/SEM-2/MBT-202/2012

2012

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) Complement fixation refers to

      a) the ingestion of C3b-coated bacteria by macrophages

      b) the destruction of complement in serum by heating at 56°C for 30 minutes

      c) the binding of complement components by antigen-antibody complexes

      d) the interaction of C3b with mast cells.

   ii) 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.

iii) 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.

iv) Natural killer cells are
   a) *B* cells that can kill without complement
   b) Cytotoxic cells
   c) Increased by immunization
   d) Able to kill virus infected cells without prior sensitization.

v) Organ-specific autoimmune disease includes
   a) thyroiditis
   b) arthritis
   c) systemic lupus erythematosus
   d) none of these.

vi) Chemically-induced tumors have tumor-assisted transplantation antigens that
   a) are always the same for a given carcinogen
   b) are different for two tumors of different histologic type even if induced by the same carcinogen
   c) are very strong antigens
   d) do not induce an immune response.

vii) 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.

viii) Which of the following surface receptors does not transduce a signal into the *T* cell ?
   a) CD3
   b) *a* and *b* chains of the TCR
   c) CD4
   d) CD8.

ix) Which one of the following statements concerning immunoglobulin allotypes is correct ?

a) Allotypes are found only on heavy chains

b) Allotypes are determined by class I MHC genes

c) Allotypes are confined to the variable regions

d) Allotypes are due to genetic polymorphism within a species.

x) Each of the following statements concerning class II MHC proteins is correct *except*

a) they are found on the surface of both *B* and *T* cells

b) they have a high degree of polymorphism

c) they are involved in the presentation of antigen by macrophages

d) they have a binding site for CD4 proteins.

xi) Individuals of blood group type *AB*

a) are Rh(d)-negative

b) are "universal recipients" of transfusions

c) have circulating anti-*A* and anti-*B* antibodies

d) have the same haplotype.

GROUP – B
(Short Answer Type Questions)

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

2. Describe the autoimmune mechanism behind Myasthenia gravis.

3. Discuss in brief atopy and anaphylaxis.

4. a) What is the difference between active and passive immunization ?

   b) Classify vaccine. 3 + 2

5. What are the different modes of action of cytokines ?

6. How will you prepare monoclonal antibody ? Explain briefly.

GROUP – C
(Long Answer Type Questions)

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

7. a) Type I Hypersensitivity reaction occurs due to induction by a specific allergen mediated by specific IgE antibodies. Describe the events of such reaction.

   b) What do you mean by erythroblastosis fetalis ? 10 + 5

8. a) An immunoglobulin molecule is made up of different domains. Explain.

   b) What are the distinct features of different multigene families of immunoglobulin light and heavy chains.

   c) Draw and explain the structure of MHC-II molecule. 3 × 5

9. a) What do you mean by complement ?

   b) Discuss the classical pathway of complement activation. 3 + 12

10. Write short notes on any *five* of the following : 5 × 3

    a) Epitope
    b) F_c fragment
    c) TCR
    d) HLA system
    e) T_H cell
    f) RIA
    g) IL-2.

11. a) How does HIV gain its way to a host cell ?

    b) "Ataxia-Telangiectasia (AT) is a primary immunodeficiency disease that involves both the *B* lymphocytes and *T* lymphocytes." Explain. 10 + 5