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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 : $10 \times 1 = 10$
 - 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 antigenantibody 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.

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- 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.

 $3 \times 5 = 15$

- 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.

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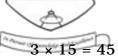
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(Long Answer Type Questions)

Answer any three of the following.



- 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