

KATHMANDU UNIVERSITY  
End Semester Examination [C]  
December, 2018

Marks scored:

Level : B. Tech.  
Year : II

Course : BIOT 207  
Semester: II

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date DEC 30 2018

SECTION "A"

[10 Q.× 1 = 10 marks]

Choose the most appropriate answer.

1. Recognition of self vs. non-self by the adaptive immune system in humans is accomplished in which of the following ways?  
 Exposure of B cells to body's own antigens in thymus  
 Exposure of B cells to body's own antigens in bone marrow.  
 Exposure of T cells to body's own antigens in bone marrow Skin  
 Exposure of T cells to body's own antigens in thymus
2. The classical pathway is activated by a combination of:  
 Antigen and antibody                       Complement, antigen and antibody  
 Virus, antigen and antibody               Bacteria, antigen and antibody
3. Papain can digest the entire IgG into  
 A two Fab fragment and one Fc fragment.  
 A one Fab fragment and one Fc fragment.  
 A two F(ab') fragment and one Fc fragment.  
 A one F(ab') fragment and Fc'
4. Biological role of the MHC proteins do not contribute to  
 Regulation of immune responses               Antigen presentation  
 Self-MHC restriction                               Control of B cell development
5. All of the following are true about neutrophils **EXCEPT**  
 Have receptors for complement components.  
 Are the main cells involve in acute inflammation  
 Have granules involved in microbial killing  
 Are cells of the adaptive immune system
6. Which of the following molecules are present on the membrane of T helper (Th) cells and are involved in their co-stimulation?  
 CD28                       B7                       LFA1                       CD40
7. You enter a dusty room, feel an itch in your nose, and sneeze. This is an example of the operation of which of the following innate immune mechanism?  
 Physical barrier produced by hairs  
 Phagocytosis by macrophages  
 Released granular contents of your granulocytes  
 Mucous combined with the movement of cilia of the lining cells

8. A fundamental difference between the antigen receptors on B cells (BCR) and on T cells (TCR) is their  
 Different requirements for antigen presentation  
 Function following antigen binding  
 Heterogeneity from one lymphocyte to the next  
 Membrane location
9. Place the following events in the order in which they would occur during the process of phagocytosis  
 1. Chemotaxis 2. Ingestion 3. Activation 4. Attachment  
 1, 2, 3, 4       4, 3, 1, 2       4, 2, 3, 1       3, 1, 4, 2
10. Typically, which of the following stimuli do T cells require to become fully activated by an antigen presenting cell?  
 I. TCR stimulation by a specific peptide/MHC complex  
 II. Activation of co-stimulatory molecules  
 III. IL-2-induced proliferation  
 I, II       I, III       II, III       I, II, III

SECTION "B"

[5 Q. × 1 = 5 marks]

Fill in the blanks:

11. Polymorphonuclear leukocytes originate from \_\_\_\_\_ progenitor.
12. Immunoglobulin \_\_\_\_\_ is the most potent opsonin.
13. Positive selection of T lymphocytes is also known as \_\_\_\_\_.
14. MHC antigens are found on all human cells except \_\_\_\_\_.
15. A typical IgA has \_\_\_\_\_ number of paratopes.

SECTION "C"

[5 Q. × 1 = 5 marks]

Define the following:

16. Complement proteins:
17. Selectins:
18. Cytokines:
19. Granzymes:
20. ADCC:

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SECTION "D"  
[7Q × 5 = 35 marks]

Attempt *ALL* questions.

1. Describe the antigen presentation pathway for viral antigens.
2. Elaborate on the role of final product of different complement pathways.
3. Discuss the role of positive and negative selections in differentiation of thymocytes to specific CD4 and CD8 T cells.
4. Discuss the four major stages in B cell development.
5. Write short note on Fc receptors.
6. The innate immune system uses two different strategies to identify pathogens: recognition of non-self and recognition of self. Give examples of each and discuss how each example contributes to the ability of the organism to protect itself from infection.
7. Discuss with an example the process and significance of isotype switching.

SECTION "E"  
[5Q × 2 = 10 marks]

8. Give TWO differences between *ANY FIVE* of the following:
  - a. Clonal anergy and Clonal ignorance
  - b. Thymus dependent and Thymus independent antigen
  - c. Central lymphoid organs and Peripheral lymphoid organs
  - d. Effector B cells and Memory B cells
  - e. Receptor editing and Affinity maturation
  - f. Opsonization and Neutralization

SECTION "F"  
[5Q × 2 = 10 marks]

9. Explain WHY/HOW for *ANY FIVE* of the following:
  - a. B and T cells are known as lymphocytes.
  - b. Hypersensitivity is an undesirable immune response.
  - c. IgM has the highest avidity.
  - d. All immunoglobulin molecules on the surface of a single B cell have same idiotype
  - e. MHCII does not bind peptides destined for MHCI
  - f. Macrophages are capable of expressing both MHCI and MHCII.

