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University Examinations 2023/2024

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN MEDICAL MICROBIOLOGY

HMM 3225: PRINCIPLES OF IMMUNOLOGY

DATE: APRIL 2024

TIME: 2 HOURS

INSTRUCTIONS:

- (i) The paper consists of **Three** Sections
 - (ii) Section A: Multiple Choice Questions
 - (iii) Section B: Short Answer Questions
 - (iv) Section C: Long Answer Questions
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SECTION 1: MULTIPLE CHOICE QUESTIONS (20 MARKS) (ANSWER ALL QUESTIONS IN THIS SECTION)

1. Which historical figure is often credited as the father of immunology?
 - a) Louis Pasteur
 - b) Edward Jenner
 - c) Robert Koch
 - d) Emil von Behring
 2. Which of the following is NOT considered a primary lymphoid organ?
 - a) Thymus
 - b) Spleen
 - c) Bone marrow
 - d) None of the above
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3. What is the major histocompatibility complex (MHC) responsible for?
 - a) Self and non-self discrimination
 - b) Activation of B cells
 - c) Phagocytosis
 - d) T cell development
4. Which of the following is NOT a physical factor contributing to innate immunity?
 - a) Temperature
 - b) pH
 - c) Genetics
 - d) Skin
5. Which type of immunity involves the transfer of antibodies from mother to fetus through the placenta?
 - a) Natural passive immunity
 - b) Artificial passive immunity
 - c) Natural active immunity
 - d) Artificial active immunity
6. Which type of T cell is primarily responsible for activating other immune cells?
 - a) Helper T cell
 - b) Cytotoxic T cell
 - c) Memory T cell
 - d) Regulatory T cell
7. Which complement pathway is activated by the binding of mannose-binding lectin to microbial carbohydrates?
 - a) Classical pathway
 - b) Lectin pathway
 - c) Alternative pathway
 - d) All of the above
8. What is the function of cytokines in the immune system?
 - a) To inhibit immune responses
 - b) To promote inflammation
 - c) To regulate immune cell communication

- d) To directly kill pathogens
9. Which immunoglobulin is most abundant in the bloodstream?
- a) IgM
 - b) IgD
 - c) IgG
 - d) IgE
10. Which type of hypersensitivity reaction involves IgE-mediated responses to allergens?
- a) Type I
 - b) Type II
 - c) Type III
 - d) Type IV
11. What is the primary function of B cells in the immune system?
- a) Phagocytosis
 - b) Antigen presentation
 - c) Antibody production
 - d) Cytokine secretion
12. Which of the following is NOT a characteristic feature of the alternative pathway of complement activation?
- a) It does not require antibodies for activation.
 - b) It involves the spontaneous hydrolysis of C3.
 - c) It is primarily activated by microbial cell wall components.
 - d) It is slower compared to the classical pathway.
13. Which term describes the phenomenon where T cells and B cells recognize and respond to a diverse array of antigens?
- a) Clonal selection
 - b) Anergy
 - c) Tolerance
 - d) Immunological memory
14. What is the function of the membrane attack complex (MAC) in the complement system?
- a) Opsonization
 - b) Phagocytosis

- c) Lysis of target cells
 - d) Chemotaxis
15. Which of the following is a characteristic feature of autoimmune diseases?
- a) They are always caused by genetic factors.
 - b) They result from an exaggerated immune response to self-antigens.
 - c) They only affect the innate immune system.
 - d) They do not involve T cells.
16. Which cells are primarily responsible for phagocytosis in the innate immune system?
- a) T cells
 - b) B cells
 - c) Macrophages
 - d) Natural killer cells
17. Which type of hypersensitivity reaction involves immune complex deposition in tissues?
- a) Type I
 - b) Type II
 - c) Type III
 - d) Type IV
18. What is the role of regulatory T cells in the immune system?
- a) To promote inflammation
 - b) To suppress immune responses and prevent autoimmunity
 - c) To activate cytotoxic T cells
 - d) To produce antibodies
19. Which class of immunoglobulin is involved in mucosal immunity and is commonly found in secretions such as saliva and tears?
- a) IgA
 - b) IgD
 - c) IgM
 - d) IgE
20. What is the main function of dendritic cells in the immune system?
- a) Antibody production
 - b) Phagocytosis of pathogens

c) Antigen presentation to T cells

d) Cytokine secretion

SECTION II: SHORT ANSWER QUESTIONS (40 MARKS)

1. Describe the secondary lymphoid tissues (5 marks)
2. Distinguish between the primary and secondary humoral immune responses (5 marks)
3. Describe the three functionally distinct T lymphocytes (5 marks)
4. Describe physical and mechanical barriers in innate immune system (5 marks)
5. Briefly describe the adaptive immune system (5 marks)
6. Briefly describe activation of antibody dependent cellular cytotoxicity (5 marks)

LONG ANSWER QUESTIONS-Choose any 2 (20 MARKS EACH)

QUESTION ONE

Describe the types of hypersensitivities (20 marks)

QUESTION TWO

- a) Describe the classic pathway in the complement system (10 marks)
- b) Describe the alternative pathway in the complement system (10 marks)

QUESTION THREE

- a) Describe the antibody structure (5 marks)
- b) Describe the classes of immunoglobulins (15 marks)