



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)
(MAIN CAMPUS)**

**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

**FIRST YEAR SECOND SEMESTER
END OF SEMESTER EXAMINATIONS
FOR THE BACHELOR OF SCIENCE IN PHYSIOTHERAPY
COURSE CODE: HPT 113/HCI 201
COURSE TITLE: FUNDAMENTALS OF IMMUNOPATHOLOGY**

DATE: FRIDAY 14TH APRIL 2023

TIME: 8:00-10:00 AM

INSTRUCTIONS:

**ANSWER ALL QUESTIONS IN SECTION A, B AND C
USE DIAGRAMS WHERE NECESSARY**

MMUST observes ^{TIME: 2 Hours} ZERO tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over

1. The specialised receptor that binds antigens on the B lymphocyte membrane is called
 - (a) The T cell receptor
 - (b) CD 4
 - (c) Notch 1 receptor
 - (d) mIg

2. Natural killer cells release the following microbicidal agent called
 - (a) The membrane attack complex
 - (b) Vitronectin
 - (c) Perforin
 - (d) Decay accelerating factor

3. Which one of the following complexes forms the alternative pathway C5 convertase
 - (a) C3bBb
 - (b) C4b2a3b
 - (c) C3bBbC3bP
 - (d) C4b2a

4. The reason why the complement cascade's activation on red blood cells (as opposed to microbial surfaces) is limited is
 - (a) Due to the presence of the decay accelerating factor
 - (b) Regulation by C1 inhibitor
 - (c) Due to the presence of limiting factors H and I
 - (d) Due to the presence of the membrane cofactor protein

5. Select the unconventional T cell subtype that straddles the border between innate (by have PRRs) and adaptive (by developing memory phenotype) immunity
 - (a) Suppressor / regulatory T cells
 - (b) Gamma delta T cells
 - (c) Cytotoxic T cells
 - (d) Helper T cells

6. Identify a cellular product that DOES NOT arise from the common lymphoid progenitor from MPHSCs
 - (a) Neutrophils
 - (b) Natural Killer (NK) cells
 - (c) B lymphocytes
 - (d) T lymphocytes

7. Select an aspect which is NOT associated with B lymphocyte mediated immunity
- (a) Differentiated B cells called plasma cells secrete immunoglobulins
 - (b) Memory B lymphocytes are responsible for the rapid humoral responses during future antigenic encounters
 - (c) They have cytoplasmic granules that release alpha defensins with microbicidal effects
 - (d) The B lymphocytes circulate in lymphoid tissues such as the spleen and lymph nodes
8. The cell surface molecule that is important in the presentation of extracellular antigenic peptides to helper T lymphocytes is
- (a) MHC class I
 - (b) Kit ligand
 - (c) MHC class II
 - (d) Membrane-bound IgD
9. Identify an INCORRECT statement concerning immunodeficiencies
- (a) They can be caused by aging
 - (b) They are all acquired during a person's lifetime
 - (c) Obesity, alcoholism and drug use can lead to immunodeficiencies
 - (d) Poor diet and thymectomy at an early age can lead to immunodeficiencies
10. Select a statement that is TRUE concerning flow cytometry
- (a) Its functions can equally be performed by the X ray crystallographer
 - (b) Direct or indirect immunofluorescence is used in tagging cells in suspensions
 - (c) It is commonly used due to the easy affordability of its reagents
 - (d) It is crucial in hybridoma technology
11. The adaptive immune system
- (a) Mounts nonspecific responses
 - (b) Facilitate immediate and maximal responses to infections
 - (c) Confers immunological memory
 - (d) Involve only cell mediated immunity
12. Select an inflammatory mediator that is INCORRECTLY matched with an inflammatory function
- (a) Endogenous pyrogen interleukin 1 - raises core temperature
 - (b) Histamines - promote vascular permeability
 - (c) Eicosanoids - stimulate suppuration
 - (d) Heparin - inhibits coagulation
13. All the following bone marrow microenvironment components support the multipotential haematopoietic stem cell (MPHSC) anchoring EXCEPT
- (a) Osteoprogenitor cells
 - (b) Stromal cells
 - (c) Endothelial cells
 - (d) Fibroblasts

14. The lymphoid organ in which T lymphocytes precursors undergo full processing to maturity is
 (a) The thymus gland
 (b) The lymph node
 (c) The spleen
 (d) The bone marrow
15. Identify cellular products that DO NOT originate from the common myeloid progenitor
 (a) Natural killer cells
 (b) Erythrocytes
 (c) Dendritic cells
 (d) Monocytes
16. Identify the CORRECT T lymphocyte developmental sequence
 (a) Stem cell, double negative T cells, single positive T cells, double positive T cells
 (b) Stem cell, double positive T cells, single positive T cells, double negative T cells
 (c) Stem cell, double positive T cells, double negative T cells, single positive T cells
 (d) Stem cell, double negative T cells, double positive T cells, single positive T cells
17. The specialised receptor that transduces the signal for commitment to the T cell lineage is called
 (e) T cell receptor
 (f) CD 4
 (g) Notch 1 receptor
 (h) mIg
18. Natural killer cells release the following microbicidal agents EXCEPT
 (e) Membrane attack complex
 (f) Perforin
 (g) Granzymes
 (h) Alpha defensins
19. Which one of the following complexes forms the alternative pathway C3 convertase
 (e) C3bBb
 (f) C4b2a3b
 (g) C3bBbC3bP
 (h) C4b2a
20. Identify the MOST IMPORTANT complement effector molecule that is a strong anaphylatoxin mediator
 (e) C5a
 (f) C3a
 (g) C5b
 (h) C3b

SECTION B: SHORT ANSWER QUESTIONS [40 MARKS]

1. Identify and give the functions of any four mediators of inflammation **(4 marks)**
2. Describe how the complement cascade is regulated **(4 marks)**
3. Describe four functions of the lymph node as a lymphoid organ **(4 marks)**
4. Describe four forms of mechanical surface barriers that aid in preventing entry of microbes into the body **(4 marks)**
5. Examine the differences between the innate and adaptive immune systems **(4 marks)**

6. Outline any four characteristics of immunoglobulin M **(4 marks)**
7. With appropriate examples, describe what autoimmunity entails **(4 marks)**
8. Briefly explain why the engagement of the TCR-CD 3 complex by the MHC-antigen complex alone does not activate the CD 4+ T cells **(4 marks)**
9. Outline the significance of interactions between lymphocytes and non-lymphoid cells in the lymphoid organs **(4 marks)**
10. Discuss the immunoelectrophoresis technique **(4 marks)**
11. Define the following:
- (a) Intercellular adhesion molecules and caspases **(2 marks)**
 - (b) Monovalent and polyvalent vaccines **(2 marks)**
 - (d) Primary and secondary lymphoid organs **(2 marks)**

SECTION C: LONG ANSWER QUESTIONS

[40 MARKS]

1. Divulge mechanisms that trigger the MBL pathways **(10 marks)**
2. Discuss physiological and anatomical features of the splenic MPS components **(10 marks)**
3. Elaborate on innate leukocytic anti-pathogen capabilities **(20 marks)**