



(University of Choice)

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

(MAIN CAMPUS)

**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

**SECOND YEAR SECOND SEMESTER
END OF SEMESTER EXAMINATIONS**

**1. THE BACHELOR OF SCIENCE
IN NURSING SCIENCES**

COURSE CODE: HCL 201

COURSE TITLE: HAEMATOLOGY

DATE: 1ST APRIL 2022 TIME: 9:00-11:00 AM

INSTRUCTIONS:

**ANSWER ALL QUESTIONS IN SECTION A AND B, ONLY TWO IN SECTION
THREE**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination
cheating

This Paper Consists of 6 Printed Pages. Please Turn Over

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. Surface blood cell negativity is classifiably
 - (a) A surface CD parameter
 - (b) A zeta potential component
 - (c) An Elie Metchnikoff mechanism
 - (d) Eryptosis involvement
2. The study of large sets of proteins involved in haemnatology is called
 - (a) Haematophysiology
 - (b) Haematoproteomics
 - (c) Haematomics
 - (d) Diagnostic haematology
3. A substance that can only elicit an blood response when attached to a large carrier protein is called
 - (a) A hapten
 - (b) An allergen
 - (c) An adjuvant
 - (d) A vaccine
4. The antibody that is primarily involved in the protection of mucosal surfaces
 - (a) Osteopontin
 - (b) Coverdin
 - (c) Ankyrin
 - (d) Beta defensin
5. In thalassemia
 - (a) Haemoglobin molecules cluster at exchange circuits
 - (b) RBC potential if reduced
 - (c) Very few globins are synthesised
 - (d) Involve cell cycle is disrupted
6. Select an inflammatory mediator that is CORRECTLY matched with an inflammatory function
 - (a) Endogenous pyrogen interleukin 1 –promote vascular permeability
 - (b) Histamines – raise core temperature
 - (c) Eicosanoids – promote fever and vasodilation
 - (d) Heparin – promotes coagulation
7. All the following are bone marrow microenvironment components support the multipuripotent haematopoietic stem cell (MPHSC) EXCEPT
 - (a) Chemoattractants
 - (b) Cytokines
 - (c) Growth factors
 - (d) Extracellular matrix molecules
8. The lymphoid organ in which B lymphocytes precursors undergo full processing to maturity is
 - (a) The thymus gland
 - (b) The lymph node
 - (c) The spleen
 - (d) The bone marrow
9. Identify cellular products that originate from the common myeloid progenitor
 - (a) Natural killer cells
 - (b) T lymphocytes
 - (c) B lymphocytes
 - (d) Monocytes
10. The following statements are true of the spleen EXCEPT
 - (a) It acts as a platelet storage center, storing 30% of the bodies platelet content

- (b) Its germinal centers are involved in immunoglobulin M synthesis
 - (c) Its periarteriolar lymphoid sheath is the site of red blood cell destruction
 - (d) It has a stagnant blood flow and an almost glucose free environment
11. 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) mlg
 12. Natural killer cells release the following microbicidal agent called
 - (a) The membrane attack complex
 - (b) Vitronectin
 - (c) Perforin
 - (d) Decay accelerating factor
 13. Which one of the following complexes forms the alternative pathway C5 convertase
 - (a) C3bBb
 - (b) C4b2a3b
 - (c) C3bBbC3bP
 - (d) C4b2a
 14. 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
 15. 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
 16. 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
 17. 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
 18. 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
 19. 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

20. 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

SECTION B: SHORT ANSWER QUESTIONS [40 MARKS]

1. Provide the essential signaling requirements for regular erythropoiesis (4 marks)
2. Describe how whole blood exhibits non-Newtonian fluid dynamics (4 marks)
3. Describe four functions of the lymph node as a haematopoietic organ (4 marks)
4. Describe the haematopoietic cell cycle kinetics (4 marks)
5. What are the definitive features of acute leukaemia (4 marks)
6. What are the components of Protein Band 4.1R macromolecular complex (4 marks)
7. What does zeta potential estimation entail (4 marks)
8. Present a clear illustration of a flow cytometer (4 marks)
9. Outline the significance of interactions between lymphocytes and non-lymphoid cells (4 marks)
10. What is the erythrocyte sedimentation rate (4 marks)

SECTION C: LONG ANSWER QUESTIONS [40 MARKS]

1. Explain the importance of angiogenesis and its applications (10 marks)
2. Discuss the MALT components of the lymphoid structures (10 marks)
3. Describe the Cluster of Designation expression, functions and applications (20 marks)