



(University of Choice)

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

**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER
END OF YEAR EXAMINATIONS
FOR THE BACHELOR OF CLINICAL MEDICINE**

COURSE CODE: HCL 202

COURSE TITLE: CLINICAL IMMUNOLOGY AND IMMUNOPATHOLOGY

DATE: MONDAY 17TH APRIL 2023

TIME: 8:00-10:00 AM

INSTRUCTIONS:

ANSWER ALL QUESTIONS IN SECTION A, B AND C

USE DIAGRAMS WHERE NECESSARY

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

(30 MARKS)

1. The MHC molecular family that is generated as a secretory product is
 - (a) Class IIIB
 - (b) Class III
 - (c) Class IA
 - (d) HLA II

2. Amongst the body cellular components regarded as off-switches is
 - (a) CD 40
 - (b) CTLA-4
 - (c) Neuropilin-1
 - (d) Fas-FasL nexus

3. Which of the following genetic markers is associated with protection against the development of diabetes?
 - a. Arginine at DQa52
 - b. Aspartic acid at DQb57
 - c. B27 positivity
 - d. D3/DR4 positivity

4. In the chronic granulomatous disease (CGD)
 - (a) Monocytes and neutrophils fail to produce the reactive oxygen intermediates
 - (b) There should be weekly prophylactic treatment with antibiotics
 - (c) IL-4 can stimulate the production of super oxide by CGD neutrophils
 - (d) There is subnormal MHC class II molecule expression

5. The innate immune system DOES NOT
 - (a) Mounts nonspecific responses
 - (b) Facilitate immediate and maximal responses to infections
 - (c) Confer immunological memory
 - (d) Involve cell mediated and antibody mediated immunity

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 multipotential 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. Which one of the following organ or tissue transplants is LEAST likely to cause a graft-versus-host reaction?
- a. Bone marrow
 - b. Heart-lungs
 - c. Kidney
 - d. Liver
 - e. Small intestine
12. The major pathogenic factor(s) in hyperacute graft rejection is (are):
- a. Anti-Rh antibodies
 - b. Killer (K) lymphocytes
 - c. Natural killer cells

- d. Predifferentiated cytotoxic T lymphocytes
 - e. Preformed cytotoxic antibodies
13. The main problem facing surgeons trying to perform xenogeneic transplants is:
- a. Scarcity of suitable sources for the grafts
 - b. Technical difficulties associated with the size of the organs
 - c. Development of chronic rejection after a few months
 - d. Severe hyperacute rejection
 - e. Ethical problems
14. Which of the following is characteristic of tolerance induced with low doses of a given protein?
- a. Both T and B lymphocytes are unresponsive
 - b. Only B lymphocytes are unresponsive
 - c. T lymphocytes are predominantly affected
 - d. The autoreactive clones are permanently deleted
 - e. The duration of the tolerant state is relatively short
15. Which of the following characteristics best defines thyroid-stimulating anti- bodies?
- a. Activation of thyroid function after binding to the thyroglobulin receptor
 - b. Association with Graves' disease
 - c. Blocking the binding of TSH to its receptor
 - d. IgG isotype
 - e. Mimicking the effects of TSH upon binding to the TSH receptor
16. Which of the following genetic markers is associated with protection against the development of diabetes?
- a. Arginine at DQa52
 - b. Aspartic acid at DQb57
 - c. B27 positivity
 - d. D3/DR4 positivity
 - e. Valine at DQb57
17. A patient develops jaundice and is found to have positive serologies for hepatitis B. Several weeks later the patient continues to have elevated liver enzymes and positive serologies and starts to complain of joint pains. Soon thereafter she develops hemorrhagic skin lesions in the lower extremities. Her platelet count is within normal limits. Which of the following mechanisms is most likely involved in the later manifestations of this patient's disease?
- a. Deposition of circulating immune complexes
 - b. Deposition of unconjugated bilirubin in tissues
 - c. Exacerbation of the liver disease by co-infection with hepatitis D virus
 - d. Production of antiviral antibodies cross-reactive with tissue antigens
 - e. Reaction of autoantibodies with tissue antigens

18. Which one of the following is TRUE concerning cancer immunotherapy
- (a) Hypergammaglobulinaemia is ameliorative
 - (b) Radioimmunoconjugates are highly immunogenic
 - (c) IL-2-stimulated NK cells are active against renal carcinoma
 - (d) Oncogenic viral protein vaccines are yet to be featured
19. Which feature is characteristic of the acute phase of HIV infection
- (a) High anti-p24 and anti-gp120 antibodies
 - (b) Presence of a higher viral load than it detectable asymptomatic phase
 - (c) Below 200 CD 4+ T-cells per μL of whole blood
 - (d) C3b production mutations
20. In the chronic granulomatous disease (CGD)
- (e) Monocytes and neutrophils fail to produce the reactive oxygen intermediates
 - (f) There should be weekly prophylactic treatment with antibiotics
 - (g) IL-4 can stimulate the production of super oxide by CGD neutrophils
 - (h) There is subnormal MHC class II molecule expression

SECTION B: SHORT ANSWER QUESTIONS

[40 MARKS]

1. Outline the features predominate DTH reactions **(5 marks)**

2. Outline parameters of HIV-mediated downregulation of CD4+ cellular populations **(5 marks)**

3. Provide the characteristics of CD 40 L **(5 marks)**

4. What is ataxia telangiectasia **(5 marks)**

5. Outline the features that distinguish innate mechanisms from adaptive immune reactions **(5 marks)**
 - Innate immune sytem; non-specific, exposure leads to immediate maximal response, no immunological memory developed, found in nearly all forms of life
 - Adaptive immune system; pathogen and antigen-specific response, lag time between exposure and maximal response, immunological memory developed, found only in jawed animals

6. Outline any properties of NF- κ B **(5 marks)**

7. Provide information on unfortunate trigger events capable of causing to auto-reactivity **(5 marks)**

8. What reactional steps are deployed into over-drive during anaphylaxis **(5 marks)**

SECTION C: LONG ANSWER QUESTIONS

[30 MARKS]

1. Describe features of hexameric and pentameric IgM polymers and syndromes associated with them
(10 marks)
2. Describe features of ZAP-70
(10 marks)
3. Delineate dysfunctions originating from innate biochemical cascade attack mechanisms
(10 marks)