



*(University of Choice)*

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

**(MAIN CAMPUS)**

**UNIVERSITY EXAMINATIONS  
2018/2019 ACADEMIC YEAR**

**END OF SEMESTER TWO EXAMINATIONS**

**FOR THE BACHELOR OF SCIENCE IN**

- 1. MEDICAL LABORATORY SCIENCES**
- 2. BIOLOGY**
- 3. BIOTECHNOLOGY**
- 4. MEDICAL BIOTECHNOLOGY**

**COURSE CODE: BML 328 /SZL 412**

**COURSE TITLE: CLINICAL IMMUNOLOGY AND VACCINOLOGY/  
APPLIED IMMUNOLOGY**

**DATE: 22<sup>ND</sup> MAY 2019**

**TIME: 8.00 -10.00 AM**

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**INSTRUCTIONS:**

**ANSWER ALL QUESTIONS IN THIS EXAMINATION**

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. Identify a VCAM-1 binding partner
  - (a) VLA-4
  - (b) Napsin
  - (c) Calreticulin
  - (d) DNA Clamp
  
2. Renal carcinomas can be treated using
  - (a) LFA-3
  - (b) IL-12
  - (c) LAK cells
  - (d) Lecithin
  
3. An example of a new vaccine delivery system is one that uses
  - (a) A Sabin kit
  - (b) Toll binding products
  - (c) Nanoneedle
  - (d) ISCOMS
  
4. T-cell mediated hypersensitivity is not implicated as a MAIN pathogenic factor in
  - (a) Systemic lupus erythematosus
  - (b) Multiple sclerosis
  - (c) Rheumatoid synovial reactions
  - (d) Hashimoto's thyroiditis
  
5. Which one of the following is not a powerful immunosuppressive fungal and bactericidal derivative that can interfere with T-cell signalling
  - (a) Tacrolimus
  - (b) Rapamycin
  - (c) Cyclophosphomide
  - (d) Cyclosporin A
  
6. In the treatment of autoimmune disease
  - (a) Therapy rarely involves metabolic control
  - (b) Intravenous Ig is of little benefit due to the presence of ant-idiotypic antibodies
  - (c) Blockade of TNF-alpha is highly effective against rheumatoid arthritis
  - (d) Plasma exchange has replaced antimetabolic drugs
  
7. In the protection of the foetal allograft, the placenta produces the following inhibitory factors EXCEPT
  - (a) TGF - beta
  - (b) TNF - alpha
  - (c) IL - 10
  - (d) IL - 4
  
8. Chronic graft rejection
  - (a) May involve graft arteriosclerosis
  - (b) Primarily results in neutrophil and eosinophil activation
  - (c) Stimulated B-cell accumulation
  - (d) Occurs days after initial immunosuppressive therapy

9. Which one of the following is TRUE regarding the changes that take place on the surfaces of tumor cells
- The very late antigen 4 is a neoplastic marker
  - The melanoma antigen gene becomes silent tumorigenic conversion
  - P-selectin and beta-catherin are candidate tumor rejection antigens
  - The ras and HER/neu antigens are weakly expressed by tumors
- (a) Which one of the following is not involved in type III hypersensitivity trigger mechanisms
- Mast cell degranulation that releases inflammatory mediators
  - Antigen-antibody complexes
  - Complement and macrophage activation
  - Platelet aggregation
10. Identify an enzyme that is NOT involved in the type I hypersensitivity inflammatory reactions
- Chymase
  - Cathepsin G
  - Indoleamine, 2, 3 -dioxygenase
  - Carboxypeptidase
11. The following points are true concerning the HIV retroviral genome EXCEPT
- It is flanked by long terminal repeats involved in viral integration and genome regulation
  - The Gag, Pol, and Env proteins are synthesised by all infectious retroviruses
  - It can be read in three frames
  - The *Nef* mRNA is mainly involved as a transcription activator
12. Which one of the following is implicated in immune evasion mechanisms of tumors
- Hypergammaglobulinaemia
  - Concomitance in pyogenic infections
  - Lack of B 7.1 and B 7.2 molecules
  - HLA –B 53 hypervariations
13. Which feature is characteristic of the asymptomatic phase of HIV infection
- Presence of a higher viral load than it detectable in the primary infection
  - High anti-p24 and anti-gp120 antibodies
  - Below 200 CD 4+ T-cells per  $\mu$ L of whole blood
  - C3b
14. The DI George syndrome
- Is a primary T cell deficiency
  - Involves failure in splenic development during foetal life
  - Is associated with LFA-1 dysfunctions
  - Leads to poor MHC class II molecule expression
15. The protein calcineurin
- Ultimately upregulates IL-2 expression
  - Performs adjuvant activities when included in vaccines
    - Is pentameric and induces mast cell degranulation
  - Is involved in allergy by binding to allergens and triggering histamine release
16. Identify a therapeutic agent against cancer
- Coumarin nonapeptides

- (b) Anti carcinoembryonic antigen antibodies
- (c) Bexaar anti-CD 20 antibodies attached to <sup>131</sup>I
- (d) Anti-TNF-alpha antibodies

17. In combined immunodeficiency syndromes
- (a) The Wiskott Aldrich Syndrome is characterised by thrombocytopenia
  - (b) Ataxia telangiectasia causes hypogammaglobulinaemia
  - (c) Duncan's syndrome reduces IFN-gamma expression
  - (d) SCID can be caused by mutations in complements deficiency genes

18. The following immune components play the MOST crucial roles in anti-parasitic immunity EXCEPT

- (a) Eosinophilia
- (b) T helper 2-based immunity
- (c) Immunoglobulin E
- (d) The Complement system

19. Which one of the following statements is NOT 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) Fluorescent light emitted by cells is measured by photomultiplier detectors
- (d) Cells exiting a flow cell are illuminated by a laser beam

20. Intracellular bacteria can evade phagocytic damage by host cells through the following mechanisms EXCEPT

- (a) Inhibition of phagosome-lysosome fusion
- (b) Resistance to oxidative and lysosomal attack
- (c) Resistance to superoxide anions
- (d) Escape from the phagosome

## SECTION B: SHORT ANSWER QUESTIONS [40 MARKS]

1. What are DNA vaccines (4 marks)
2. Describe the features of an effective vaccine (4 marks)
3. Distinguish between toxoid and killed vaccines (4 marks)
4. Describe immune responses to tumors (4 marks)
5. Briefly discuss hyper acute rejection of transplants (4 marks)
6. What is meant by 'atopic allergy'? Briefly explore this in the context of allergic rhinitis (4 marks)
7. Outline the autoimmune basis of multiple sclerosis (MS) (4 marks)
8. Describe the Chediak Higashi disease (4marks)
9. Define the following: (4 marks)

(a) Adjuvant

(b) Anaphylaxis

**SECTION C: LONG ANSWER QUESTIONS**

**(40 MARKS)**

**Answer ALL questions in this section**

1. Describe mucosal region protective mechanisms

**(10 marks)**

2. Discuss immunity to extracellular bacteria (support your discussion with graphical representation)

**(10 marks)**

3. Discuss the flow cytometry technique

**(20 marks)**