



**TECHNICAL UNIVERSITY OF MOMBASA**

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FACULTY OF APPLIED AND HEALTH SCIENCES  
DEPARTMENT OF ENVIROMENT & HEALTH SCIENCES  
**UNIVERSITY EXAMINATION FOR:**  
BACHELOR OF SCIENCE IN ENVIROMENTAL HEALTH  
AML 4121 : FUNDAMENTALS OF IMMUNOLOGY  
SPECIAL SUPPLEMENTARY EXAMINATION

**SERIES:** AUGUST 2017

**TIME:** 2 HOURS

**DATE:** 1 Sep 2017

**Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of **TWO** Section(s). Attempt ALL questions.

**Circle the correct answer in section A.**

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PAPER II

Section A 30 Marks

1. An antigen found in relatively high concentration in the plasma of normal fetuses and a high proportion of patients with progressive carcinoma of the colon is
  - A. viral antigen.
  - B. carcinoembryonic antigen.
  - C. alpha-fetoprotein.
  - D. heterophil
  - E. Fungus
2. An antibody directed against the idiotypic determinants of a human IgG antibody would react with
  - A. the Fc part of the IgG.
  - B. an IgM antibody produced by the same plasma cell that produced the IgG.

C. all human kappa chains.

D. all human gamma chains.

E. FC part

3. Which one of the following is NOT true of the gene segments that combine to make up a heavy-chain gene?

A. Many V region segments are available.

B. Several J segments and several D segments are available.

C. V, D, and J segments combine to encode the antigen-binding site.

D. A V segment and a J segment are preselected by an antigen to make up the variable-region portion of the gene.

E. Few V region segments are available.

4. When immune complexes from the serum are deposited on glomerular basement membrane, damage to the membrane is caused mainly by

A. gamma interferon.

B. phagocytosis.

C. cytotoxic T cells.

D. Enzymes released by polymorphonuclear cells.

5. If an individual was genetically unable to make J chains, which immunoglobulin(s) would be affected?

A. IgG

B. IgM

C. IgA

D. IgG and IgM

E. IgM and IgA

6. The antibody-binding site is formed primarily by

A. the constant regions of H and L chains.

B. the hypervariable regions of H and L chains.

C. the hypervariable regions of H chains.

D. the variable regions of H chains.

E. the variable regions of L chains.

7. The class of immunoglobulin present in highest concentration in the blood of a human newborn is

A. IgG.

B. IgM.

C. IgA.

D. IgD.

E. IgE.

8. Individuals of blood group type AB

A. Are Rh(d)-negative.

B. Are "universal recipients" of transfusions.

C. Have circulating anti-A and anti-B antibodies.

D. Have the same haplotype.

E. Have different haplotype.

9. Cytotoxic T cells induced by infection with virus A will kill target cells

A. from the same host infected with any virus.

B. infected by virus A and identical at class I MHC loci of the cytotoxic T cells.

C. infected by virus A and identical at class II MHC loci of the cytotoxic T cells.

D. infected with a different virus and identical at class I MHC loci of the cytotoxic cells.

E. infected with a different virus and identical at class II MHC loci of the cytotoxic cells.

10. Antigen-presenting cells that activate helper T cells must express which one of the following on their surfaces?

A. IgE

B. gamma interferon

C. class I MHC antigens

D. class II MHC antigens

E. IgG

11. Which one of the following does NOT contain C3b?

A. classic-pathway C5 convertase

B. alternative-pathway C5 convertase

C. classic-pathway C3 convertase

D. alternative-pathway C3 convertase

E. C3 convertase

12. Which one of the following is NOT true regarding the alternative complement pathway?

A. It can be triggered by infectious agents in absence of antibody.

B. It does not require C1, C2, or C4.

C. It cannot be initiated unless C3b fragments are already present.

D. It has the same terminal sequence of events as the classic pathway.

E. Require C1, C2, or C4.

13. Complement lyses cells by

A. enzymatic digestion of the cell membrane.

B. activation of adenylate cyclase.

C. insertion of complement proteins into the cell membrane.

D. inhibition of elongation factor 2.

E. Factor B

14. Graft and tumor rejection are mediated primarily by

A. non-complement-fixing antibodies.

B. phagocytic cells.

- C. helper T cells.
- D. cytotoxic T cells.
- E. Antigens

15. Which one of the following properties of antibodies is NOT dependent on the structure of the heavy-chain constant region?

- A. ability to cross the placenta
- B. isotype (class)
- C. ability to fix complement
- D. affinity for antigen
- E. Avidity

16. The role of the macrophage during an antibody response is to

- A. make antibody.
- B. lyse virus-infected target cells.
- C. activate cytotoxic T cells.
- D. process antigen and present it
- E. Killing

17. The structural basis of blood group A and B antigen specificity is

- A. a single terminal sugar residue.
- B. a single terminal amino acid.
- C. multiple differences in the carbohydrate portion.
- D. multiple differences in the protein portion.
- E. Terminal amino acid.

18. Complement can enhance phagocytosis because of the presence on macrophages and neutrophils of receptors for

A. factor D.

B. C3b.

C. C6.

D. properdin.

E. Factor B

19. The main advantage of passive immunization over active immunization is that

A. it can be administered orally.

B. it provides antibody more rapidly.

C. antibody persists for a longer period.

D. it contains primarily IgM.

E. it contains primarily IgG.

20. Which of the following does **not** protect body surfaces?

A. Skin.

B. Mucus.

C. Gastric acid.

D. Salivary amylase

E. Gut microflora

21. The basic Ig unit is composed of:

A. 2 identical heavy and 2 identical light chains.

B. 2 identical heavy and 2 different light chains.

C. 2 different heavy and 2 identical light chains.

D. 2 different heavy and 2 different light chains.

E. Non-covalently bound polypeptide chains.

22. Which one of the following is a primary lymphoid organ:

A. Lymph nodes

B. Spleen

C. Peyer's patch

D. Tonsil

E. Thymus

23. A major factor regulating the adaptive immune response is:

A. The neutrophil.

B. Complement membrane attack complex.

C. C-reactive protein.

D. Antigen concentration.

E. Haptoglobin.

24. An example of a known oncogenic virus is:

A. Herpes zoster.

B. HIV-2.

C. Epstein-Barr virus.

D. Vesicular stomatitis virus.

E. *Proteus mirabilis*.

25. Acute inflammation can be initiated by:

A. An increase in vascular permeability.

B. C3.

C. Influx of neutrophils.

D. Lysozyme.

E. Mast cell activation.

26. Clonal selection occurs when antigen is encountered by:

A. Basophils

B. Eosinophils

C. Mast cells

D. Neutrophils

E. T-cells

27. The major function of Plasma cells is to secrete large amounts of antibody.

Which of the following statements regarding plasma cells is correct?

A. Are derived from T-cells

B. Develop into B-cells

C. Have a highly developed rough endoplasmic reticulum

D. Have a thin layer of cytoplasm

E. Secrete large amounts of gamma interferon

28. After the contact with foreign antigens, body produces specific antibody. These specific antibodies are readily detectable in serum following primary contact with antigen after:
- A. 10 min
  - B. 1 h
  - C. 5–7 days
  - D. 3–5 weeks
  - E. Only following a second contact with antigen
29. Adoptive transfer of acquired immune responsiveness involves the transfer of:
- A. Antibody
  - B. Complement
  - C. Phagocytes
  - D. Lymphocytes
  - E. Serum
30. What is the main functions of interferons:
- A. Are divided into 5 main families.
  - B. Are found only in mammalian species.
  - C. Are specific for individual viruses.
  - D. Induce enzyme synthesis in the target cell.
  - E. Only affect infected cells.

Section B 40 Marks

**Section B Answer all questions**

31. a). Describe using relevant examples the type IV hypersensitivity 10 marks
- b). Describe the Antigen and antibody reactions 10 marks
32. a). Explain the functions of immune system 10 marks
- b) Describe in detail the ELISA test method in aid of disease diagnosis 10 marks