



**KENYATTA UNIVERSITY**  
**UNIVERSITY EXAMINATIONS 2011/2012**

**SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF SCIENCE (MEDICAL LABORATORY)**  
**HML 108: BASIC IMMUNOLOGY**

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**DATE: WEDNESDAY 28<sup>TH</sup> MARCH 2012**

**TIME: 8.00 A.M. – 10.00 A.M.**

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**INSTRUCTIONS     SECTION A: Answer ALL Questions (each 5 Marks)**

1. With the aid of a diagram describe the structure and properties of IgM (5Marks)
2. Describe the body's adaptive immune responses to infection by viruses (5Marks)
3. Distinguish between innate and adaptive immunity (5Marks)

**SECTION B: Answer only ONE Question (20Marks)**

4. Discuss the various classes of cytokines (20Marks)
5. Discuss the various body's innate defence mechanisms to infections (20Marks)

**SECTION C: ANSWER ALL QUESTIONS BY CIRCLING THE CORRECT ONE ½  
MARK EACH)**

1. Which one of the following anatomical regions is most likely to show a predominance of T lymphocytes?  
A. A periarteriolar sheet in the spleen  
B. A Peyer's patch in the small intestine  
C. A tonsillar follicle  
D. The bone marrow  
E. The germinal center of a lymph node follicle
- Match the listed properties and characteristics in Questions 2–8 with the right type of leukocytes  
A. B lymphocytes  
B. T lymphocytes  
C. Follicular dendritic cells  
D. Neutrophils  
E. Plasma cells
2. The predominant cells in the follicles and germinal centers of the lymph nodes
3. Release perforins and granzymes
4. Recirculate between different segments of the GALT
5. Circulating phagocytes that do not express MHC II
6. Concentrate antigen on their surface

7. Migrate to the bone marrow after proliferation and differentiation in the lymph node
8. Produce and secrete large amounts of immunoglobulins
9. The first immunoglobulin class produced in a primary response to an antigen is
- A IgA
  - B IgG
  - C IgM
  - D IgE
  - E. IgD
10. The most abundant immunoglobulin class in serum is
- A IgA
  - B IgG
  - C IgM
  - D IgE
  - E. IgD
11. The domains by which immunoglobulin bind to epitope are
- A constant region
  - B variable region
  - C framework region
  - D hinge region
  - E. Light chain
12. The monomer of IgM is composed of
- A. two  $\gamma$  heavy chains, and two  $\kappa$  or two  $\lambda$  light chains.
  - B. two  $\mu$  heavy chains, and two  $\kappa$  or two  $\lambda$  light chains.
  - C. two  $\epsilon$  heavy chains, and two  $\kappa$  or two  $\lambda$  light chains.
  - D. two  $\delta$  heavy chains, and two  $\kappa$  or two  $\lambda$  light chains.
  - E. three  $\mu$  heavy chains, and three  $\kappa$  or two  $\lambda$  light chains.
13. Papain can digest the entire IgG into
- A. two Fab fragment and one Fc fragment.
  - B. one Fab fragment and one Fc fragment.
  - C. two  $F(ab')_2$  fragment and one Fc fragment.
  - D. one  $F(ab')_2$  fragment and Fc fragment

E. three Fab fragment and Fc fragment

14. The most efficient Ig involved in the classical pathway of complement activation is

A IgA

B IgG

C IgM

D IgE

E. IgD

15. In the classical pathway of complement activation, C3 convertase is

A C4b2a

B C3bBb

C C4b2a3b

D C3bBb3b

E. C5-9

16. The fragment that does not belong to the anaphylatoxin is

A C3a

B C3b

C C4a

D. C5a

E. C2a

17. The fragment involves in the opsonization is

A C3a

B C3b

C C4a

D. C5

E. C5-9

18. Factors influence immunogenicity include

A foreignness

B molecular size

C chemical composition

D all above

E. None of the above

19. Which one of the following anatomical regions is most likely to show a predominance of T lymphocytes?

- A. A periarteriolar sheet in the spleen
- B. A Peyer's patch in the small intestine
- C. A tonsillar follicle
- D. The bone marrow
- E. The germinal center of a lymph node follicle

20. A patient born without the human bursa equivalent would be expected to have normal:

- A. Cellularity in the paracortical areas of the lymph nodes
- B. Differentiation of germinal centers in the lymph nodes
- C. Numbers of circulating lymphocytes bearing surface immunoglobulins
- D. Numbers of plasma cells in the bone marrow
- E. Tonsils

21. Where are cells expressing both CD4 and CD8 found?

- A. Spleen
- B. Thymus
- C. Bone marrow
- D. Placenta
- E. Dermis

22. Which of the following components of complement cascade is responsible for formation of the transmembrane channel through bacterial cell walls, which leads to cell lysis?

- A. C3a
- B. C3b
- C. C4a
- D. C5a
- E. C5-9

23. Which one of the following cytokines, produced by accessory cells, is believed to regulate the differentiation of TH1 cells?

- A. Interferon-gamma
- B. Interleukin-1

C. Interleukin-4

D. Interleukin-12

E. Tumor necrosis factor

24. Alloantigens are best defined as antigens:

A. Identically distributed in *all* individuals of the same species

B. That define protein isotypes

C. That differ in distribution in individuals of the same species

D. Unique to human immunoglobulin G (IgG)

E. That do not induce an immune response in animals of the same species

25. Which of the following procedures is *less* likely to enhance antigenicity?

A. Chemical polymerization of the antigen

B. High-speed centrifugation to eliminate aggregates

C. Immunization on antigen obtained from a phylogenetically distant species to that of the animal immunized

D. Injection of an antigen-adjuvant emulsion

E. Intradermal injection

26. The antigen-binding sites of an antibody molecule are determined by the structure of the:

A. Constant region of heavy chains

B. Constant region of light chains

C. Variable region of heavy chains

D. Variable region of light chains

E. Variable regions of both heavy and light chains

27. A preparation of pooled normal human IgG injected into rabbits will *not* induce the production of antibodies against:

A. Gamma heavy chains

B. Gamma 3 heavy chains

C. J chain

D. Kappa light chains

E. Lambda light chains

28. A newborn's repertoire of antibodies is shown to include all those listed below.

Which one is most likely to have been synthesized by the newborn?

- A. IgG1 anti-Rh
- B. IgG2 anti-human immunodeficiency virus (HIV)
- C. IgG3 anti-tetanus toxoid
- D. IgG4 anti-*Haemophilus influenzae* type b
- E. IgM anti-toxoplasma

29. An additional chemical defense found in tears and saliva?

- A) T lymphocytes
- B) saline
- C) lysozyme
- D) EFC
- E) Histamine

30. The class-specific antigenic determinants of immunoglobulins are associated with the:

- A. J chain
- B. T chain
- C. H chain
- D. L chain
- E. Secretory component