**CHUKA**  **UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**RESIT/SPECIAL EXAMINATION**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN NURSING**

**NURS 226/NURU 125: IMMUNOLOGY**

**STREAMS: BSC NURS (Y2S2) & BSC NURS (UPGRADING) (Y1T3) TIME: 2 HOURS**

**DAY/DATE: WEDNESDAY 03/11/2021 2.30 P.M – 4.30 P.M.**

## INSTRUCTIONS:

- Do not write anything on the question paper.
- Mobile phones and any other reference materials are NOT allowed in the examination room.
- The paper has THREE sections. Answer ALL questions.
- Answers for SECTION A should be on first page of the answer booklet.
- Number ALL your answers and indicate the order of appearance in the space provided in the cover page of the examination answer booklet

**SECTION A (30 marks)**

1. Which immunoglobulin is the predominant antibody in the secondary immune response?
    a. IgG
    b. IgM
    c. IgE
    d. IgA
    e. IgD
2. Patients with C5 through C9 complement deficiencies would be most likely to have which of the following infections?
    a. AIDS
    b. Meningococcal infection

c. Pneumococcal infection
d. Giardiasis
e. Histoplasmosis

**3.** There are at least 10 properties of cytokines. Which of the following is one of these characteristics?
a. Mitogenesis
b. B-cell lipids
c. Lipopolysaccharide (LPS) activation
d. T-cell differentiation
e. Hormonal antibody synthesis

**4.** Immunity may be natural or acquired. Which of the following best describes acquired immunity?
a. Increase in C-reactive protein (CRP)
b. Presence of natural killer (NK) cells
c. Complement cascade
d. Maternal transfer of antibody
e. Inflammatory response

**5.** Which of the following is the earliest site of hematopoiesis in the embryo:
a. Bone marrow
b. Thymus
c. Yolksac
d. Spleen

**6.** The cytokine which is most involved in the class switch to IgE production is:
a. IL-2
b. TGF-beta
c. IL-4
d. IL-5

**7.** Specific immunological unresponsiveness is called *tolerance.* Which one of the following statements best describes immunological tolerance?
a. Immunologic maturity of the host does not play a major role
b. It occurs only with polysaccharide antigens
c. It is related to the concentration of antibody
d. It is best maintained by the presence of polysaccharide antigens
e. It is prolonged by administration of immunosuppressive drugs

**8.** It appears that HIV binds selectively to CD4 glycoproteins. Thus, HIV shows a selective infection with the destruction of helper T cells. Which of the following cells exhibit CD4 glycoprotein on their cell surface?
a. Macrophages
b. Polymorphonuclear leukocytes
c. Suppressor lymphocytes
d. Columnar epithelial cells

e. Squamous epithelial cells

**9.** Which one of the following statements best describes properties of interleukin 1 (IL-1)?
   a. It is a macrophage-derived product
   b. It does not activate B cells
   c. It may stimulate cytoxic B cells
   d. There is a single biologically active form
   e. Its activity is histocompatibility-restricted

**10.** Cytokines always act
   a. By binding to specific receptors.
   b. In an autocrine fashion
   c. At long range
   d. Antagonistically with other cytokines.

**11.** The T-cell receptor link to MHC/peptide is enhanced by interaction between MHC class II on the antigen-presenting cells with the following molecule on the T-cell:
   a. LFA-1
   b. CD2
   c. CD8
   d. CD28

**12.** CD8 is a marker of:
   a. B-cells
   b. Helper T-cells
   c. Cytotoxic T-cells
   d. A neutrophil precursor

**13.** An example of a privileged immunological site is the
   a. Bone marrow
   b. Skin
   c. Testis
   d. Lung

**14.** Survival of allografts is increased by choosing donors with few major histocompatibility complex (MHC) mismatches with recipients and by use of immunosuppression in recipients. Which one of the following procedures might be a useful measure of immunosuppression?
   a. Administration of corticosteroids to recipient
   b. Lymphoid irradiation of donor
   c. Administration of immunoglobulin to recipient
   d. Destruction of donor B cells
   e. Destruction of donor T cells

**15.** Complement is a series of important host proteins which provide protection from invasion by foreign microorganisms. Which one of the following statements best describes complement?
   a. Complement inhibits phagocytosis

b. Microorganisms agglutinate in the presence of complement but do not lyse
c. Complement plays a minor role in the inflammatory response
d. Complement protects the host from pneumococcal and *Haemophilus* infection through complement components C1, C2, and C4
e. Complement is activated by IgE antibody classes

**16.** Which of the following is the immunoglobulin that is initially seen on the primary immune response?

a. IgG
b. IgM
c. IgE
d. IgA
e. IgD

**17.** The bone marrow is a site of:

a. Very little antibody production.
b. Antibody production against T-independent antigens only.
c. Long term antibody production.
d. Antibody production by pre-B cells.

**18.** Lymphocytes:

a. Enter the tissues and remain there for the rest of their life.
b. When mature are only found in secondary lymphoid organs
c. Recirculate between blood and lymphoid tissues
d. Are only educated in the thymus

**19.** Which of the following functions are macrophages unable to carry out:

a. Pinocytosis.
b. Phagocytosis.
c. Antigen processing.
d. T-cell priming.

**20.** A hapten is:

a. An epitope.
b. A paratope.
c. A small chemical grouping which reacts with preformed antibodies.
d. An immunogen

**21.** A *hapten* is a nonimmunogenic small protein. Which of the following statements best describes haptens?

a. Haptens activate T cells
b. Penicillin is a hapten
c. Haptens do not react with specific antibody
d. Haptens bind the major histocompatibility complex (MHC)
e. Poison ivy is caused by a small protein that is not a hapten

**22.** The major role of T cells in the immune response includes which one of the following?

a. Recognition of epitopes presented with major histocompatibility complex molecules on all surfaces
b. Complement fixation
c. Phagocytosis
d. Production of antibodies

**23.** Which one of the following statements best describes immunoglobulin structure?

a. The amino acid sequence variation of the heavy chains is different than that observed in light chains
b. In humans, there are approximately twice as many Ig molecules with κ and λ chains
c. In the three-dimensional structure of Ig, there is little, if any, flexibility in the hinge region between the Fc and two Fab portions
d. IgM is a monomeric structure
e. Ig structural studies have been difficult because there is no readily available model protein

**24.** Interleukin 1 (IL-1) is a potent cytokine. It is best described by which one of the following statements?

a. Synthesis of IL-1 is inhibited in activated macrophages
b. It can be produced by natural killer cells
c. It exerts its effects on T and B cells as a costimulator
d. It is multimeric and consists of more than one protein
e. IL-6 has an inhibitory effect on IL-1

**25.** Which immunoglobulin mediates immediate hypersensitivity and is involved in immune response to parasitic infections?

a. IgG
b. IgM
c. IgE
d. IgA
e. IgD

**26.** The function of MHC- II molecules is to present:

a. exogenous antigen peptides to T killer cells.
b. endogenous antigen peptides to T cells.
c. processed antigen peptides to CD4+ T cells.
d. processed antigen peptides to CD8+ T cells

**27.** Which immunoglobulin is the primary antibody in saliva, tears, and intestinal and genital secretions?

a. IgG
b. IgM
c. IgE

d. IgA
e. IgD

**28.** An allograft is best described as a
a. Transplant from one region of a person to another
b. Transplant from one person to a genetically identical person
c. Transplant from one species to the same species
d. Transplant from one species to another species

**29.** Which of the following organs constitute primary lymphoid organs?
a. Bone marrow and thymus
b. Thymus and spleen
c. Spleen and lymph nodes
d. Lymph nodes and bone marrow

**30.** The lectin pathway leads to activation of the classical complement pathway through:

a. antibody binding.
b. production of C1 complex.
c. mannose-binding lectin (MBL) and activation of MBL associated serum proteases (MASP).
d. C5 convertase

**SECTION B (30 MARKS)**

1. With the aid of a diagram describe the structure of immunoglobulin. (5 marks)
2. Describe Five biological functions of antibodies in host defence. (5 marks)
3. State five (5) functions of Macrophages. (5 marks)
4. Describe the role host defences in autoimmune diseases. (5 marks)
5. Highlight on the cellular basis of immune response. (6 marks)
6. Describe the regulatory role of T-lymphocytes. (4 marks)

**SECTION C (40 MARKS)**

1. Describe the lectin pathway of complement activation. (20 marks)
2. Highlight on the various types of hypersensitivity reactions. (20 marks)

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