KENYATTA UNIVERSITY

CONTINUING EDUCATION PROGRAMME (CEP) 2021/2022

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN NURSING

HNS 192: IMMUNOLOGY

APRIL 2022 SESSION TIME: 2 HOURS

SECTION A: Multiple choice questions (20 Marks)

1. Which one of the following cells is the main initiator of adaptive immune response:
   A. Eosinophil
   B. Neutrophil
   C. Dentritic cell
   D. Macrophage

2. One of the following cells is NOT a major professional APC
   A. Macrophages
   B. Epithelial cells
   C. B lymphocytes
   D. Dendritic cells

3. Which one of the following is **NOT** a type of immunoprecipitation:
   A. Ouchterlony
   B. Immunodiffusion
   C. Radial immunodiffusion
   D. Complement fixation

4. Which one of the following would be protective to a patient suffering from acute tetanus infection:
   A. An attenuated vaccine of *Clostridium tetani*
   B. A modified live vaccine of *C. tetani*
   C. Tetanus toxoid
   D. Immunoglobulin against tetanus toxin

5. B cells become tolerant to self in the periphery through:

A. Clonal deletion

B. Clonal anergy

C. Foreign T cell help

D. Synergy

6. Severe combined immunodeficiencies are characterized by the following EXCEPT:

A. Adenosine deaminase gene deletion

B. Scarcity of lymphoid tissue

C. Increased expression of HLA-DP, -DQ and -DR

D. Severe depression in the numbers and functions of T and B cells

7. The mechanisms governing development of myasthenia gravis are dependent on:

A. CD8+ T cells

B. TH1 cells

C. Macrophages

D. Autoantibodies

8. Natural killer cells assess whether other cells are abnormal by detecting types and levels of surface-associated

A. MHC class I molecules.

B. Non-self molecules.

C. Pathogen-associated molecular patterns.

D. Pattern recognition receptors.

9. Three days ago, an otherwise healthy 17-year-old boy sustained a skin laceration during a football match. This morning, he became suddenly ill with a fever, general muscle aches, and dizziness; then he lost consciousness. His blood leukocyte count was 22,000 cells per ul (reference range: 4,500 to 12,500 per ul). The predominant cell type(s) in this patient's blood is/are most likely

A. B lymphocytes.

B. Juvenile and mature neutrophils.

C. Monocytes and macrophages.

D. Natural killer cells.

10. Inoculation intramuscularly with SARS-CoV-2 RNA vaccine preparation is to stimulate one of the following types of immunity
    A. Adaptive
    B. Artificial active
    C. Artificial passive
    D. Natural active

11. Under ideal physiologic conditions, the cells of the immune system are mostly surrounded by what type of antigens
    A. Foreign harmless antigens
    B. Foreign harmful antigens
    C. Self-harmless antigens
    D. Self-harmful antigens

12. The failure to inactivate or eliminate self-reactive cells results in
    A. Autoimmunity.
    B. Positive selection.
    C. Negative selection.
    D. Tolerance.

13. A cell with in the thymus undergoes positive selection. Successful completion of this process results in one of the following by that cell
    A. Activation of the classical complement pathway
    B. An ability to bind both MHC class I and II molecules
    C. Loss of either the CD4 or CD8 protein
    D. Programmed cell death

14. A 3-month-old infant born premature at 35 weeks of gestation is being evaluated for ocular problems and seizures. An x-ray of this infant's head reveals extensive cerebral calcification in the periventricular areas. Because of this combination of clinical signs, the possibility of congenital toxoplasmosis is considered. Elevated levels (titers) of one

of the following types of antibodies, if directed against *Toxoplasma gondii*, would best support this diagnosis

A. IgG

B. IgM

C. IgD

D. IgA

15. RhoGAM (anti-Rh antibodies) blocks one of the following anti-D antibody isotopes:

A. IgM

B. IgD

C. IgE

D. IgG

16. The following cytokine is characteristically produced in a TH1 response:

A. IL-2

B. IL-4

C. IL-5

D. IL-1

17. The role played by Major Histocompatibility Complex 1 and 2:

A. Transduce the signal to T cells following antigen recognition

B. Mediate immunogenic class switching

C. Present antigens for recognition by T cell antigen receptors

D. Enhance the secretion of cytokine

18. One of the following is TRUE of negative selection in T cell development

A. Deletion of cells that fail to express T cell receptor

B. Death due to weak recognition of self MHC

C. Death due to strong affinity for self antigens

D. Apoptosis due to failure to recognize self MHC

19. One of the following is type IV hypersensitivity reaction

    A. Arthus reaction
    B. Serum sickness
    C. Schwartzman reaction
    D. Granulomatous disease

20. Two days after penicillin administration, antibodies developed that resulted in hemolysis. ONE of the following is the correct type of hypersensitivity reaction described

    A. Type-I
    B. Type-II
    C. Type-III
    D. Type-IV

SECTION B: Short answer questions (40 Marks)

1. a) Define inflammation (1 mark)
   b) Explain the four cardinal signs of inflammation as stated by Celsus. (4 marks)
2. State five functions of antibodies in protection against bacteria. (5 marks)
3. Outline the mechanism of Type I hypersensitivity reaction. (5 marks)
4. a) Distinguish between primary and secondary immunodeficiency (2 marks)
   b) State the clinical features of severe combined immunodeficiency (SCID) in infants. (4 marks)
5. Outline five characteristics of IgG (5 marks)
6. State factors influencing tolerance induction (5 marks)
7. Outline the steps involved in a western blot test (5 marks)
8. State with examples in each case, any five functions of cytokines (5 marks)

Section C: Essay questions (40mks).

1. a) Describe complement activation through the classical pathway (10 marks)
   b) Explain any five functions of the complement system (10 marks)
2. a) Describe the process of activation of B lymphocytes (10 marks)
   b) Explain how the skin and mucous membrane features serve as part of innate immunity (10 marks)