

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

**FIRST YEAR EXAMINATION FOR BACHELOR OF SCIENCE IN PUBLIC HEALTH**

**PUHE 126: IMMUNOLOGY**

**STREAMS: BSC (PUHE) Y1S2**

**TIME: 2 HOURS**

**DAY/DATE: MONDAY 22/03/2021**

**11.30 A.M – 1.30 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 in Sections I and II and ONE question in section III.
- All your answers for Section I (MCQs) should be on one page.
- Number ALL your answers and indicate the order of appearance in the space provided in the cover page of the examination answer booklet.
- Write your answers legibly and use your time wisely

**SECTION 1: MULTIPLE CHOICE QUESTIONS [10 MARKS]**

**Tick the correct answer**

1. Which year was the last known case of naturally acquired smallpox reported?

- [ a ] 1977
- [ b ] 1980
- [ c ] 1948
- [ d ] 1987

2. Which statement below correctly defines Classical Immunology

- [ a ] Study of factors responsible for development of immune cells and organs in an organism's body.
- [ b ] Study of diseases caused by disorders of the immune system
- [ c ] Study of vaccines and other agents that modify immune reaction to specific pathogens
- [ d ] Study of the relationship between the body systems, pathogens, and immunity.

3. Which one of the following cells does not arise from the common lymphoid progenitor (CLP) lineage of hematopoietic stem cell (HSC).

- [ a ] Granulocytes
- [ b ] B lymphocytes
- [ c ] T lymphocytes
- [ d ] NK cells

4. Which statement correctly defines the concept of herd immunity as applied in immunization

- [a] the more individuals who become immunized against a specific disease, the slower the disease will spread and the more people will be exposed
- [b] the less individuals who become immunized against a specific disease, the slower the disease will spread and the fewer people will be exposed
- [c] the more individuals who become immunized against a specific disease, the slower the disease will spread and the fewer people will be exposed
- [d] the more individuals who become immunized against a specific disease, the faster the disease will spread and the fewer people will be exposed

5. Where does T lymphocytes mature?

- [ a ] Bone marrow
- [ b ] Spleen
- [ c ] Thymus
- [ d ] Lymph nodes

6. Which one of the following is not one of the key characteristics of innate immunity

- [ a ] There is no development of persistent memory
- [ b ] Response to repeat infection is the same each time
- [ c ] Response time is minutes to hours
- [ d ] It is highly specific in response

7. Which one of the following cells does not function as a professional antigen-presenting cell (APC)?

- [ a ] Monocytes
- [ b ] Macrophages
- [ c ] Dendritic cells
- [ d ] T Lymphocytes

8. Which one of the following disease categories is not exclusively associated with dysfunction or failure of the immune system

- [ a ] Infectious diseases
- [ b ] Hypersensitivity diseases
- [ c ] Autoimmune diseases
- [ d ] Immune deficiency diseases

9. Which one of the following can be said to be an emerging disease?

- [ a ] Tuberculosis
- [ b ] Ebola virus disease
- [ c ] Smallpox
- [ d ] Polio

10. Which one of the following statements correctly defines the mechanism of subunit vaccine strategy

- [ a ] Microorganisms are killed making them incapable of replication, but still allows them to induce an immune response to at least some of the antigens contained within the organism.
- [ b ] The strategy uses only specific, purified macromolecules derived from the pathogen.
- [ c ] Individual genes that encode key antigens of especially virulent pathogens are introduced into attenuated viruses or bacteria.
- [ d ] Microorganisms are disabled so that they lose their ability to cause significant disease but retain their capacity for transient growth within an inoculated host.

## **SECTION II: SHORT ANSWER QUESTIONS [40 MARKS]**

**Answer all the questions**

1. Define the following terms

- [ a ] Immunization [2 marks]
- [ b ] Antibody [2 marks]
- [ c ] Vaccination [2 marks]

2. The historical perspectives credits vaccination as one of the key concepts that led to the development of immunology. However, “Immunology Is About More Than Just Vaccines and Infectious Disease”. Explain why immunization is about more than just vaccines and infectious diseases.

[4 marks]

3. B Lymphocytes are one of the key cells that arise from the common lymphoid progenitor (CLP) lineage of hematopoietic stem cell (HSC). Describe the development, characteristics and functions of the B Lymphocytes.

[5 marks]

4. Discuss the characteristics and role of Bone Marrow as one of the key primary lymphoid organs. [5 marks]

5. Discuss the live-attenuated vaccine strategy stating its functional principles, its advantages and disadvantages. [10 marks]

6. Hygiene hypothesis is one particularly interesting concept to explain the occurrence of allergic disease, especially in developed countries. Explain the rationale and immunologic mechanisms related to Hygiene Hypothesis.

[10 marks]

### **SECTION III: LONG ANSWER QUESTIONS [20 MARKS]**

#### **Answer one question.**

1. Early scientific evidence on vaccinated individuals indicated that immune protection was mediated by cells and some soluble agents in the blood. Discuss the two components of immunity as revealed by these early scientific studies. [20 marks]

2. The immune system is indeed comprised of two interconnected systems (arms) of immunity which collaborate to protect the body against foreign invaders. Discuss the two arms of the immune system. [20 marks]

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