



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF NURSING AND MIDWIFERY SCIENCES
BACHELOR OF SCIENCE IN NURSING (BSN)
September-December 2024 Trimester Main Examination**

COURSE CODE AND TITLE: BSM 113- Human Physiology I

DATE:

TIME: 2 HOURS

START: 9:00AM

END: 11:00AM

Instructions

- 1) This exam is out of 70
- 2) This paper has three sections: Section I: Multiple choice Questions (MCQ) (20 marks), Section II: Short answer questions (SAQ) (30 marks) and Section III: Long answer question (LAQ) (20marks)
- 3) Answer **ALL** questions in Section I and Section II and III
- 4) Answer all the questions in the examination booklets provided
- 5) Any rough work to be done at the back of the answer booklet

SECTION I: MULTIPLE CHOICE QUESTIONS 20MARKS

1. The blood type which is known as the universal donor is:
 - A. Type A
 - B. Type AB
 - C. Type O
 - D. Type B
2. The type of white blood cell which is primarily involved in allergic reactions is:
 - A. Neutrophils
 - B. Basophils
 - C. Lymphocytes
 - D. Eosinophils
3. During the rising phase of an action potential:
 - A. Voltage-gated Na⁺ channels open.
 - B. Voltage-gated K⁺ channels open.
 - C. Voltage-gated Na⁺ channels close.
 - D. Voltage-gated K⁺ channels close.
4. An action potential in a nerve fiber:
 - A. Occurs when its membrane is hyperpolarized to a critical level
 - B. Is associated with a transient increase in membrane permeability to sodium
 - C. Is associated with a transient decrease in membrane permeability to potassium
 - D. Has amplitude that varies with the strength of the stimulus
5. The actions of Angiotensin II include all the following EXCEPT:
 - A. Vasoconstriction
 - B. Increased secretion of aldosterone
 - C. Increased blood volume
 - D. Vasodilation
6. The following are necessary for maintaining balance EXCEPT:
 - A. The Semicircular canals
 - B. The Vestibules
 - C. The nephrons
 - D. Skeletal muscles
7. The taste sensation caused by the presence of H⁺ ions is:
 - A. Sweet taste

- B. Sour taste
 - C. Salty taste
 - D. Bitter taste
8. The cranial nerve that serves the posterior 1/3 of the tongue is:
- A. Glossopharyngeal
 - B. Vagus
 - C. Hypoglossal
 - D. Trigeminal
9. T-lymphocytes include all except:
- A. CD4
 - B. Plasma
 - C. CD8
 - D. Memory T cell
10. The plasma protein which is essential for blood clotting is:
- A. Albumin
 - B. Hemoglobin
 - C. Fibrinogen
 - D. Immunoglobulin
11. After calcium ions are released from the sarcoplasmic reticulum, they:
- A. Initiate an action potential
 - B. Bind to actin
 - C. Cause sodium channels to open in the sarcolemma membrane
 - D. Bind to troponin
12. The total number of alveoli present in the human lung is estimated at:
- A. 1 billion
 - B. 800 million
 - C. 600 million
 - D. 1500 million
13. The statements which is true about internal respiration is:
- A. Production of ATP
 - B. Exchange of gases between the bloodstream and tissue cells
 - C. Exchange of gases between alveoli and the bloodstream
 - D. Breathing between the atmosphere and the alveoli
14. Conduction speed is slowest in

- A. SA node
 - B. Purkinje Fibres
 - C. Ventricular myocardium
 - D. Bundle of His
15. The center for touch, cold, and pressure is in the:
- A. Frontal lobe
 - B. Occipital lobe
 - C. Parietal lobe
 - D. Cerebellum
16. The sodium-potassium ATPase (sodium pump) is:
- A. A symporter
 - B. A uniporter
 - C. An antiporter
 - D. An example of secondary active transport
17. Ion channels in the cell membrane:
- A. Are always selective for a particular ion
 - B. Are opened and closed by a process called gating which is brought about by changes in the protein subunits
 - C. Cannot be gated by pH changes in the external environment
 - D. Provide a charged hydrophobic pore through which ions can diffuse across the lipid bilayer
18. Exocytosis is the process by which cells:
- A. Pass substances out of the cell in vesicles
 - B. Pass substances out of the cell through the cell membrane by osmosis
 - C. Release substances directly into the extracellular fluid through a pore
 - D. Release substances directly into the extracellular fluid through a pit
19. The nitrogenous base Adenine can pair with:
- A. Cytosine
 - B. Guanine
 - C. Thymine
 - D. Uracil
20. The DNA transcribing enzyme is:
- A. Ligase
 - B. DNA polymerase

- C. RNA polymerase
- D. Polymerase chain reaction

SECTION II: SHORT ANSWER QUESTIONS- 30 MARKS

1. Describe blood flow through the heart (8 marks)
2. Explain three (3) hormonal mechanisms of controlling blood pressure (6 marks)
3. Explain the four (4) properties of muscular tissue (8 marks)
4. State three (3) parts of a reflex arc (3 marks)
5. Describe the five (5) steps in chemical neurotransmission (5 marks)

SECTION III: LONG ANSWER QUESTIONS – 20 MARKS

1. Concerning the respiratory system
 - a. With the help of a diagram explain intrapleural and intrapulmonary pressures during the respiratory cycle (5 marks)
 - b. Outline five (5) functions of the surfactant (5 marks)
 - c. Explain five (5) factors affecting the oxygen-hemoglobin dissociation curve (10 marks)