



AMREF INTERNATIONAL UNIVERSITY

SCHOOL OF MEDICAL SCIENCES

DEPARTMENT OF NURSING & MIDWIFERY SCIENCES

END OF SEMESTER AUGUST 2026 EXAMINATIONS

COURSE CODE AND TITLE: BSN 113: Medical Physiology I

DATE: 3RD AUGUST 2026

Duration: 2 HOURS

Start: 9:00 AM

Finish: 11:00 AM

INSTRUCTIONS

1. This exam is out of 70 marks
2. This Examination comprises THREE Sections. Section I: Multiple Choice Questions (20 marks) Section II: Short Answer Questions (30 marks) and Section III: Long Answer Questions (20 marks)
3. Answer ALL Questions.
4. Do Not write anything on the question paper -use the back of your booklet for rough work if need be.

SECTION I: MULTIPLE CHOICE QUESTIONS**20 MARKS**

1. The defining property of nerve and muscle tissues is:
 - A. Excitability
 - B. Extensibility
 - C. Contractility
 - D. Elasticity
2. The basic contractile unit of a myofibril is the:
 - A. Sarcoplasm
 - B. Transverse tubules
 - C. Sarcomere
 - D. Sarcoplasmic reticulum
3. The following bodily process utilizes the positive feedback loop:
 - A. Control of blood sugar
 - B. Thermoregulation
 - C. Delivery
 - D. Maintenance of water balance
4. The following fluids make up the extracellular environment except:
 - A. Cerebral spinal fluid
 - B. Urine
 - C. Plasma
 - D. Interstium
5. The rate of conduction of action potentials along a nerve will be increased by:
 - A. Stimulating the $\text{Na}^+ - \text{K}^+$ pump
 - B. Decreasing the diameter of the nerve
 - C. Myelinating the nerve
 - D. Lengthening the nerve fiber
6. Transport of glucose proceeds at the same rate down and electrochemical gradient by which of the following processes?
 - A. Facilitated diffusion
 - B. Primary active transport
 - C. Contransport
 - D. Countertransport
7. The permeability of a solute in a lipid bilayer will be increased by an increase in the
 - A. Molecular radius of the solute
 - B. Oil/water partition coefficient of the solute
 - C. Thickness of the bilayer
 - D. Concentration difference of the solute across the bilayer.

8. A drug completely blocks Na^+ channels in nerves. which of the following effects on the action potential would it be expected to produce?
- A. Block the occurrence of action potentials
 - B. Increase the rate of rise of the upstroke of the action potential
 - C. Shorten the absolute refractory period
 - D. Abolish the hyperpolarizing after-potential
9. At the muscle end plate, acetylcholine (ACh) causes the opening of
- A. Na^+ channels and depolarization toward the Na^+ equilibrium potential
 - B. K^+ channels and depolarization toward the K^+ equilibrium potential
 - C. Na^+ and K^+ channels and depolarization to a value halfway between the Na^+ and K^+ equilibrium potential
 - D. Na^+ and K^+ channels and hyperpolarization to a value halfway between the Na^+ and K^+ equilibrium potential
10. The following are part of plasma proteins which one is not?
- A. Fibrinogen
 - B. Albumin
 - C. Globulin
 - D. Prothrombin
11. Stretching a myocardial cell
- A. only decreases the force of a contraction.
 - B. only increases the force of contraction.
 - C. decreases the force of a contraction and allows more Ca^{2+} to enter.
 - D. allows more Ca^{2+} to enter and increases the force of a contraction.
12. The action potential in a cardiac contractile cell causes
- A. opening of L-type calcium channels.
 - B. opening of ryanodine receptor calcium channels.
 - C. activation of sodium-potassium ATPase.
 - D. activation of NCX transporters.
13. The P wave of an ECG corresponds to
- A. the depolarization of the atria.
 - B. the progressive wave of ventricular depolarization.
 - C. the repolarization of the ventricles.
 - D. atrial repolarization.
14. The QRS complex of an ECG corresponds to
- A. the depolarization of the atria.
 - B. the progressive wave of ventricular depolarization.
 - C. the repolarization of the ventricles.
 - D. atrial repolarization.
15. Which event happens at the start of a cardiac cycle?
- A. Blood is ejected from the atrium.
 - B. The SA node fires.
 - C. The P wave develops.
 - D. Ventricular systole occurs.

16. Air entering the body is filtered, warmed, and humidified by the
A. upper respiratory tract.
B. lower respiratory tract.
C. lungs.
D. alveoli.
17. External respiration involves the
A. movement of air into and out of the lungs.
B. diffusion of gases between the alveoli and the circulating blood.
C. exchange of dissolved gases between the blood and the interstitial fluid.
D. binding of oxygen by hemoglobin.
18. When you inhale, your lungs expand easily because they have
A. low compliance.
B. high compliance.
C. low elasticity.
D. high elasticity
19. Which of the following organs is not part of the lower respiratory system?
A. oropharynx
B. bronchioles
C. larynx
D. bronchi
20. Which of the following is most important in keeping food out of the trachea?
A. extrinsic muscles of the larynx
B. epiglottis
C. glottis
D. soft palate

SECTION II: SHORT ANSWER QUESTION (SAQ)

(30 MARKS)

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|---|-----------|
| 1) Outline different body fluid compartments and their compositions | (3 marks) |
| 2) Outline five cell organelles and state their functions | (5 marks) |
| 3) With the help of a diagram describe the neuromuscular junction | (7 marks) |
| 4) Describe the difference between arteries and veins | (5 marks) |
| 5) Describe the mechanics of ventilation | (5 marks) |
| 6) Outline how RBCs are adapted to their functions | (5 marks) |

SECTION III: LONG ANSWER QUESTION (LAQ)

(20 MARKS)

- 1) (a) Discuss oxygen transport in the body (8 Marks)
(b) Discuss carbon dioxide transport in the body (8 Marks)
(c) Explain two lung volumes and two lung capacities (4 Marks)