CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN NURSING

NURS 112: MEDICAL PHYSIOLOGY 1

STREAMS: NURS **TIME: 2 HOURS**

DAY/DATE: TUESDAY 16/12/2014 **11.30 A.M. – 1.30 P.M.**

INSTRUCTIONS:

- **The examination consists of three section; A, B and C**
- **Answer all questions in sections A and B**
- **Answer only one question in section C**

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. All of the following are functions of the proteins in the plasma membrane except:
   (a) Some proteins are enzymes
   (b) Most proteins are receptors
   (c) They are involved in the transport functions
   (d) They have important role in nuclear division

2. In adults, extracellular fluid (ECF) differs from intracellular fluid (ICF) in that:
   (a) The volume of ECF is greater
   (b) The tonicity of ECF is lower
   (c) In the ECF, the anions are mainly inorganic (chloride and bicarbonate)
   (d) In the ECF, the pH is lower

3. In the synaptic end bulb, acetylcholine is released from the synaptic vesicles by the process called?
   (a) Simple diffusion
   (b) Phagocytosis
   (c) Endocytosis
   (d) Exocytosis
4. Which of the following types of solutions would cause swelling of the red blood cells (RBCs)?
   (a) Isotonic
   (b) Hypertonic
   (c) Hypotonic
   (d) Hydrophilic
5. Concerning the ribosomes, one of the following statements is not true
   (a) Ribosomes located in the endoplasmic reticulum synthesize proteins for insertion in the plasma membrane.
   (b) Structurally ribosomes consist of 2 subunits of equal size
   (c) Free ribosomes synthesize proteins used in the cytosol
   (d) Ribosomes located within mitochondria synthesize mitochondrial proteins
6. Which of the following characteristics is shared by simple diffusion and facilitated diffusion?
   (a) Can be blocked by specific inhibitors
   (b) Do not require adenosine triphosphate (ATP)
   (c) Require transport protein
   (d) Transport solute against concentration gradient
7. Which of the following is true concerning the ion channels?
   (a) Ion channels increase the permeability of the membrane to ions
   (b) An ion channel is a pore that is not open at all times
   (c) Ion channels exhibit selectivity by allowing only certain ions to flow through the channel.
   (d) All of the above are properties of all ion channels

8. Which of the following will be affected directly if the mitochondria in a cell are not functioning properly?
   (a) Absorption of alcohol by the cell
   (b) The movement of water into and out of the cell
   (c) The movement of oxygen across the cell membrane
   (d) The movement of sugar from a low to a high concentration

9. All the following statements are functions of the smooth endoplasmic reculum except:
   (a) Fat metabolism
   (b) Synthesis of cholesterol
   (c) Synthesis of protein
   (d) Detoxification

10. The following statements are true of interneurons except:
   (a) They are located entirely within central nervous system
   (b) About 10% of neurons in the human brain are interneurons
   (c) Interneurons form complex neuronal pathways
   (d) Interneurons carry out the integrative function of the nervous system

11. At the chemical synapse in the CNS, the release of neurotransmitter is dependent upon which of the following?
   (a) Opening of ligand-gated calcium channels
   (b) Influx of calcium into the presynaptic terminal
   (c) Hyperpolarization of the synaptic terminal
   (d) Synthesis and release of acetylcholinesterase

12. Which of the following substances found in plasma is the major factor that contributes to plasma colloid osmotic pressure?
   (a) Sodium chloride
   (b) Glucose
   (c) Albumin

(d) Cholesterol

13. Which of the following has the fastest rate of movement across the capillary wall?

(a) Sodium

(b) Oxygen

(c) Glucose

(d) Albumin

14. Which of the following is associated with the first heart sound?

(a) Opening of the A-V valves

(b) Closing of the A-V valves

(c) Closing of the pulmonary valve

(d) In-rushing of blood into the ventricles due to atrial contraction

15. Which of the following white blood cells are involved in phagocytosis?

(a) Neutrophils and monocytes

(b) Lymphocytes and eosinophils

(c) Basophils and neutrophils

(d) Basophils and eosinophils

16. Which of the following is not true concerning the red blood cells (RBCs)?

(a) Mature RBCs have no nucleus

(b) RBCs generate ATP anaerobically

(c) Red blood cells live only about 120 days

(d) Mature RBCs contain multiple mitochondria

17. Which of the following is not a property of graded potentials?

(a) They get weaker as they spread from the point of stimulation

(b) They are irreversible

(c) They can be summed up

(d) They can be either excitatory or inhibitory

18. The surfactant lining the lung alveoli

(a) Increases the compliance of the lungs

(b) Reduces the surface tension of the alveoli

(c) Prevents the collapse of the alveoli

(d) All of the above

19. Which of the following is part of the respiration process

(a) Diffusion

(b) Gas transport

(c) Tissue gas exchange

(d) All of the above

20. Sympathetic stimulation of the heart normally causes which of the following conditions?

(a) Acetylcholine release at the sympathetic endings

(b) Increased force of contraction of the ventricles

(c) Decreased heart rate

(d) Decreased rate of conduction of the cardiac impulse

SECTION B: SHORT – ANSWER QUESTIONS (30 MARKS)

1. Transport of materials across the plasma membrane is essential for the cellular life:

(a) Describe how the following transport processes occur in human cells:

(i) Facilitated diffusion [2 marks]

(ii) Primary active transport [2 marks]

(iii) Secondary active transport [2 marks]

(b) Explain the factors that influence the diffusion rate of substances across plasma membranes. [4 marks]

2. Explain the forces that determine the movement of fluids across the plasma membrane. [4 marks]

3. Explain how the factors affect the affinity of hemoglobin for oxygen.

(a) Temperature [2 marks]

(b) Partial pressure of CO_2 [2 marks]

(c) pH [2 marks]

4. Describe the factors that determine the stroke volume. [6 marks]

5. Explain the homeostatic functions of the neuroglia. [4 marks]

SECTION C: LONG – ANSWER QUESTIONS (20 AMRKS)

1.	(a)	Explain how the external respiration takes place in the lungs.	[4 marks]
	(b)	Discuss the factors that affect pulmonary ventilation.	[16 marks]
2.	(a)	Explain the phases of the cardiac action potential.	[8 marks]
	(b)	Describe the hormonal mechanisms that regulate blood pressure.	[12 marks]
