



AMREF INTERNATIONAL UNIVERSITY

SCHOOL OF MEDICAL SCIENCES

DEPARTMENT OF NURSING AND MIDWIFERY SCIENCES

BACHELOR OF SCIENCE IN NURSING

END OF SEPTEMBER-DECEMBER TRIMESTER 2022 EXAMINATIONS

UNIT CODE: BSN 113

UNIT NAME: MEDICAL PHYSIOLOGY I

DATE: 28TH NOVEMBER 2022

TIME: 2 HOURS

START: 11:00AM

FINISH: 1:00PM

INSTRUCTIONS

1. This exam is out of 70 marks
2. This exam comprises of three sections.
 - Section A: Multiple choices (20 marks)
 - Section B: Short Answer questions (30 marks)
 - Section C: Long answer question (20 marks)
3. Answer all questions
4. Do not write anything on the question paper.

SECTION A: MULTIPLE CHOICE QUESTIONS

(20 MARKS)

1. For the negative feedback control:
 - A. Response always tends to correct an error that has already occurred
 - B. Errors are sometimes prevented
 - C. The controller has a variable set-point
 - D. Sensors are not essential

2. After the peptide and tRNA are hydrolyzed during termination, the new polypeptide is released from the ribosome to:
 - A. Cytoplasm
 - B. Nucleus
 - C. Ribosome
 - D. Mitochondria

3. Regarding the bicarbonate buffer:
 - A. It is primarily an intra-cellular buffer
 - B. It is quantitatively less important than the protein buffer
 - C. The level of carbon dioxide is primarily controlled by the renal system
 - D. Hyperventilation would tend to reduce the pH

4. Of the total body fluids, the interstitial fluid compartment constitutes about:
 - A. 20 %
 - B. 15 %
 - C. 30 %
 - D. 5 %

5. The end of plate potential of skeletal muscle is best characterized by:
 - A. A local reversal of charge originating at the end plate
 - B. A reversal of charge originating at the end plate and propagated throughout the cell
 - C. A local decrease in transmembrane potential that is caused by an increased permeability to Na^+ and K^+
 - D. A decrease in transmembrane potential propagated throughout the cell

6. The differences between primary and association area in the cerebral cortex are:
 - A. The association areas deal with the complex interpretation of modalities
 - B. Each primary sensory area deals with at least two modalities
 - C. The homunculus the primary areas is larger than found in the association areas
 - D. Association areas in each cerebral hemisphere are not linked together by association fibers

7. The structure that has a primary function to coordinate rate, range, force and direction of movement is:
 - A. Primary motor cortex
 - B. Premotor cortex and supplementary motor cortex
 - C. Basal ganglia
 - D. Cerebellum

8. The representational (right) hemisphere is better than the categorical (left) hemisphere at:
 - A. Language functions
 - B. Recognition of objects by their form
 - C. Understanding spoken words
 - D. Mathematical calculations

9. The following action of noradrenaline are mediated by stimulation of alpha-adrenergic receptors:
 - A. Constriction of cutaneous blood vessels
 - B. Increase of myocardial contractility
 - C. Dilation of arterioles to the viscera
 - D. Relaxation of urinary bladder

10. All the autonomic preganglionic neurons and all the parasympathetic postganglionic neurons synthesize, store, and release:
 - A. Epinephrine
 - B. Norepinephrine
 - C. Acetylcholine
 - D. Nitric oxide

11. The correct sequence of events involved in phototransduction in rods and cones in response to light is:
 - A. Activation of transducin, decreased release of glutamate, structural changes in rhodopsin, closure of Na^+ channels, and decrease in intracellular cGMP
 - B. Activation of transducin, structural changes in rhodopsin, closure of Na^+ channels, decrease in intracellular cGMP, and decreased release of glutamate
 - C. Structural changes in rhodopsin, decrease in intracellular cGMP, decreased release of glutamate, closure of Na^+ channels, and activation of transducin
 - D. Structural changes in rhodopsin, activation of transducin, decrease in intracellular cGMP, closure of Na^+ channels, and decreased release of glutamate

12. Severing the nerves that innervate the breathing muscles may lead rapidly to death. Will a spinal cord break between the level of cervical vertebrae 6 and 7 leave the victim able to breath?
 - A. No. The breathing muscles are innervated by spinal nerves that leave the spinal cord at the level of each thoracic vertebra.
 - B. Yes. The diaphragm will work as it is innervated by nerves arising from C3 to C5.
 - C. No. The breathing muscles are innervated by autonomic impulses arising from the respiratory center which is located in the brain stem.

D. Yes. The muscles of breathing are innervated by the sympathetic nervous system which is unaffected by damage to the somatic nervous system.

13. A Rh+ donor can donate blood to the following recipient:
- A. Rh-
 - B. O-
 - C. AB-
 - D. B+
14. The second stage in blood clotting is:
- A. Activation of the coagulation cascade
 - B. Endothelial damage
 - C. Formation of platelet aggregates
 - D. Vascular stasis
15. On the ECG, the 1st heart sound coincides with the following wave:
- A. T
 - B. P
 - C. QRS
 - D. S
16. Ventricular depolarization coincides in time with the following wave:
- A. T
 - B. P
 - C. QRS
 - D. P-Q interval
17. The reason that surfactant renders the alveoli so stable is it:
- A. Causes surface tension in the alveoli to be constant over all lung volumes
 - B. Lowers the compliance of the lung
 - C. Eliminates the forces of surface tension in the alveoli
 - D. Makes surface tension in the alveoli vary with lung volume
18. The respiratory muscles would have to work harder in this condition:
- A. An increase in lung compliance
 - B. A decrease in airway resistance
 - C. A decrease in the production of surfactant
 - D. An increase in tidal volume

19. The Bohr effect is that hemoglobin:
- A. Unloads more oxygen at low pH than at high pH
 - B. Unloads more carbon dioxide at low pH than at high pH
 - C. Has more affinity for oxygen at low pH than at high pH
 - D. Explains the dissociation of carbamino-hemoglobin at the lungs
20. The rate and depth of respiration are influenced by several sensory and control centers, some of which are listed here. The center located in the pons is:
- A. Central chemoreceptors
 - B. Apneustic center
 - C. Rhythmicity center
 - D. Dorsal ventilatory center

SECTION B: SHORT ANSWER QUESTIONS

(30 MARKS)

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- 1. Describe the cAMP signaling pathway in cell communication **(5 marks)**
 - 2. State five (5) effects of parasympathetic nervous stimulation **(5 marks)**
 - 3. Describe the physiology of balance **(5 marks)**
 - 4. Describe the hemostasis process **(5 marks)**
 - 5. Draw a well-labelled diagram of a cardiac muscle action potential showing all the phases clearly. **(5 marks)**
 - 6. Describe the role of chemoreceptors in regulation of respiration **(5 marks)**

SECTION C: LONG ANSWER QUESTIONS

(20 MARKS)

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- 1. The cardiovascular and respiratory systems are important in pumping blood and gas exchange that human body cells require for survival. With the aid of well-labeled diagrams:
 - a) Explain the four (4) phases of the cardiac cycle **(8 marks)**
 - b) Explain the mechanism of long-term regulation of blood pressure **(12 marks)**

THE END!