



UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

TRIMESTER EXAMINATION

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

(NURSING)

HNS 122: MEDICAL PHYSIOLOGY II

DATE: AUGUST 2, 2018

TIME: 2:00-5:00PM

INSTRUCTIONS:

Answer:

All MCQs in Section A;

All Short-answer Questions in Section B

All Long-answer Questions in Section C

Cancelled work should be done neatly by crossing with a single line in the essay and by use of X in the MCQs

SECTION A: MULTIPLE CHOICE QUESTIONS (TOTAL: 20 MARKS)

Choose (CIRCLE/TICK) only one correct answer from the following questions

Section A: Multiple Choice Questions (20 marks)

1. Some cells secrete chemicals into the extracellular fluid that act on cells in the same tissue.

Which of the following refers to this type of regulation?

- a) Neural
- b) Endocrine
- c) Neuroendocrine
- d) Paracrine

2. Increased sympathetic drive to the heart:

- a) Increases coronary blood flow
- b) Decreases rate of depolarization in the sinoatrial node
- c) Decreases the rate of conduction in the Purkinje fibers

- d) Decreases the ejection fraction of the left ventricle
3. The blood plasma is:
- a) Interstitial fluid
 - b) Extracellular fluid
 - c) Intracellular fluid
 - d) None of the above
4. All of the following chemical substances decreases heart rate except:
- a) Digitalis
 - b) Morphine
 - c) Acetylcholine
 - d) Histamine
5. In a cell, movement of molecules from an area of low concentration to an area of high concentration
- a) Uses facilitated diffusion
 - b) Requires cellular energy
 - c) Needs associated (peripheral) proteins
 - d) Uses its concentration gradient to move
6. The following will result in a transfusion reaction? Assume that the patient has never had a transfusion.
- a) Type O Rh⁻ packed cells to an AB Rh⁺ patient
 - b) Type A Rh⁺ packed cells to an A Rh⁺ patient
 - c) Type AB Rh⁺ packed cells to an AB Rh⁺ patient
 - d) Type A Rh⁺ packed cells to an O Rh⁺ patient
7. Indicate in which compartment you would find a low concentration of both K⁺ ions and proteins
- a) Intracellular fluid
 - b) Plasma
 - c) Interstitial fluid
 - d) Extracellular fluid

8. A 34-year-old woman has an ejection fraction of 25% and an end systolic volume of 150 ml. What is her end diastolic volume?
- a) 50 ml
 - b) 100 ml
 - c) 125 ml
 - d) 200 ml
9. Concerning the action potential of a nerve cell:
- a) The intensity differs from one region of the membrane to another
 - b) Occurs with equal amplitude throughout the membrane
 - c) Does not involve movement of ions
 - d) Depends on protein concentration in a cell
10. Which of the following vessels has the greatest total cross-sectional area in the circulatory system?
- a) Aorta
 - b) Small arteries
 - c) Capillaries
 - d) Venules
11. The sweat glands and piloerector muscles of hairy skin are innervated by which of the following fiber types?
- a) Cholinergic postganglionic parasympathetic fibers
 - b) Cholinergic postganglionic sympathetic fibers
 - c) Adrenergic preganglionic parasympathetic fibers
 - d) Adrenergic postganglionic sympathetic fibers
12. If a 21-year-old male patient has a cardiac reserve of 300% and a maximum cardiac output of 16L/min, what is his resting cardiac output?
- a) 3 L/min
 - b) 4 L/min
 - c) 6 L/min
 - d) 8 L/min

13. Which of the following is associated with the second heart sound?
- a) Opening of the A-V valves
 - b) Closing of the A-V valves
 - c) Opening of the pulmonary valve
 - d) Closing of the pulmonary valve
14. Which of the following applies to AIDS patients?
- a) Able to generate a normal antibody response
 - b) Increased helper T cells
 - c) Increased secretion of interleukins
 - d) Decrease in helper T cells
15. Which of the types of neurons communicates the information from the central to the peripheral nervous system?
- a) Sensory neuron
 - b) Interneuron
 - c) Motor neuron
 - d) Afferent neuron
16. Regarding the P wave of the electrocardiogram (ECG);
- a) It represents atrial depolarization
 - b) It represents depolarization of the sino-atrial nodal cells
 - c) It represents ventricular depolarization.
 - d) It represents depolarization of the atrio-ventricular node
17. A female who is blood group A marries a male who is blood group A. The following may occur among their children;
- a) Some of their children may be of blood group O
 - b) All their children will have anti A antibodies in circulation.
 - c) At least one in every 4th child they have will be blood group B

- d) Their children cannot donate blood except to type A individuals.
18. Myocardial contractility is best correlated with the intracellular concentration of:
- Na⁺
 - K⁺
 - Ca⁺⁺
 - Cl⁻
19. In the heart all the following are true except:
- The right ventricle is thicker than the left ventricle
 - The excitation wave cannot spread directly from the atria to the ventricles
 - The ventricles contract almost simultaneously
 - The sinoatrial node is the normal pacemaker
20. A reflex arc consists of the following except:
- Receptor
 - Afferent neuron
 - Ion channels
 - Efferent neuron

SECTION B: ANSWER ALL THE QUESTIONS IN THIS SECTION (40 MARKS; USE THE ANSWER BOOKLET PROVIDED)

- Describe the functions of white blood cells (6 marks)
- State five properties of muscle tissue that enhance their homeostatic roles (5 marks)
- Outline the physiological functions of the following plasma proteins (2 marks)
 - Albumin (2 marks)
 - Globulin (2 marks)
 - Fibrinogen (2 marks)
- Explain the physiological mechanisms involved in platelet plug formation (6 marks)
- Briefly describe the ionic changes during the following phases of the cardiac action potential:
 - Phase 0 (2 marks)
 - Phase 2 (2 marks)

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- c) Phase 3 (2 marks)
6. Describe three physiological factors that regulate the stroke volume (6 marks)
7. Explain the functions of the glands in the integumentary system (5 marks)

SECTION C: ANSWER ALL THE QUESTIONS IN THIS SECTION (40 MARKS; USE THE ANSWER BOOKLET PROVIDED)

1. The heart contracts from the intrauterine life until death:
- a) State the components of the cardiac conduction system in the order traveled by signals from the pacemaker cells (5 marks)
 - b) Describe three (3) factors that determine the stroke volume (6 marks)
 - c) Explain how the following hormones contribute to regulation of arterial pressure:
 - i) Renin-angiotensin-aldosterone system (3 marks)
 - ii) Epinephrine (3 marks)
 - iii) Antidiuretic hormone (3 marks)
2. The integumentary system provides the first line of defense among other physiological roles:
- a) State the five components of the integumentary system (5 marks)
 - b) Describe five (5) physiological functions of the skin (15 marks)

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