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University Examinations 2024/2025

FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
MEDICAL LABORATORY

HML 3112: HUMAN PHYSIOLOGY I

DATE: JANUARY 2025

TIME: 3 HOURS

INSTRUCTIONS:

Answer *All* questions

Ensure that all your answers are properly numbered

Part I multiple Choice Questions (MCQ): Write the correct answer on the space provided in the answer booklet. Each MCQ is one mark

Part II: Short Answer Questions – Answer questions following each other on the answer booklet

Part III: Long Answer Questions – Answer each question on the answer booklet

SECTION A: MULTIPLE CHOICE QUESTIONS (20 marks)

1. Which class of sensory receptor can modify respiratory reflexes?
 - A: Nociceptors
 - B: Chemoreceptors
 - C: Stretch receptors
 - D: All of these sensory receptors can modify respiratory reflexes.
 2. The structure of the respiratory epithelium changes along the respiratory tract. In addition to mucous cells, what other type of cells are found lining the nasal cavity, nasopharynx, and the superior portion (trachea and bronchi) of the lower respiratory system?
 - A: Simple squamous epithelial cells
 - B: Stratified squamous epithelial cells
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C: Cuboidal ciliated epithelial cells

D: Pseudostratified ciliated columnar epithelial cells

3. What is the name of the structures projecting from the lateral surfaces of the nasal cavity that function to create turbulence and help humidify and warm the incoming air?
 - A: nares
 - B: nasal vestibule
 - C: nasal septum
 - D: nasal conchae
4. Which structures in the respiratory epithelium help transport mucus out of the lower respiratory system and into the pharynx for expulsion?
 - A: Vocal folds
 - B: Cilia
 - C: Epiglottis
 - D: Uvula
5. Which of the following is part of the reflex response to an increase in arterial pressure?
 - A. Decreased firing of carotid sinus baroreceptors
 - B. Increased sympathetic activity to the ventricles
 - C. Increased parasympathetic activity to the SA Node c)
 - D. Increased parasympathetic activity to the arterioles of skeletal muscles & skin
 - E. Increased parasympathetic stimulation to the ventricles
6. The following connective tissue types is almost always in motion
 - A. Loose connective tissue
 - B. Dense connective tissue
 - C. Cartilage
 - D. Bone
 - E. Blood
7. Taking aspirin every day can reduce the risk of heart disease because:
 - A. It is a powerful vasodilator
 - B. It blocks pain receptors in heart tissue

- C. It stops ventricular fibrillation
 - D. It loosens plaque on arterial walls
 - E. It prevents platelet clumping
8. The following makes skin an excellent barrier to pathogens
- A. Presence of sweat
 - B. Presence of sebum
 - C. Presence of keratin
 - D. The fact that it is multi-layered
 - E. All of the above
9. Red blood cells;
- A. Mature in bone marrow before being released into circulation.
 - B. Have an average life span of 120 days.
 - C. Production is under control of erythro.
 - D. Originate from megaloblasts.
10. The lining of blood vessels is _____ epithelium.
- A. Simple squamous
 - B. Transitional
 - C. Simple columnar
 - D. Pseudostratified columnar
11. In normal human blood;
- A. The eosinophil is the most common type of white cell.
 - B. There are more lymphocytes than neutrophils.
 - C. Iron is mostly in the haemoglobin
 - D. There are more white cells than red cells.
12. An obvious symptom of a second-degree burn is
- A. Charring
 - B. Blisters
 - C. Loss of feeling
 - D. Redness

13. Analysis of the arterial blood gave the following values: PCO₂ 16 mm I-Ig, I-ICO 3 - 5 mmol/l and pH 7.1. The underlying acid-base disorder would be,
- A. METABOLIC Acidosis
 - B. Metabolic Alkalosis
 - C. Respiratory Acidosis
 - D. Respiratory Alkalosis
14. Which one of the following body compartment has the largest amount of body fluid?
- A. Intracellular compartment
 - B. Extracellular compartment
 - C. Lymphatic compartment
 - D. Intravascular compartment
15. Which one of the following body compartment has the largest amount of body fluid
- A. Intracellular compartment
 - B. Extracellular compartment
 - C. Lymphatic compartment
 - D. Intravascular compartment
16. The cells producing surfactant in the alveoli:
- A. Type 1 pneumocytes
 - B. Type 3 pneumocytes
 - C. Goblet cells
 - D. Type 2 pneumocytes
17. Which of the following is the location of pseudo stratified columnar ciliated epithelium
- A. Liver
 - B. Nasopharynx
 - C. Nephron
 - D. Parathyroid epithelium
18. Which of the following is not a basic function of cells
- A. Reproduction
 - B. Growth

- C. Excitability
 - D. Adaptability
19. Which compartment has the highest potassium levels:
- A. Intracellular compartment
 - B. Extracellular compartment
 - C. Vascular compartment
 - D. Interstitial compartment
20. Causes of increased hydrostatic pressure include
- A. Hypertension
 - B. Nephrotic syndrome
 - C. Malnutrition
 - D. Liver cirrhosis

SECTION B: SHORT ANSWER QUESTIONS (30 MARKS)

- a) Define signal transduction pathway (2 marks)
- b) State General functions of cell membrane proteins (6 marks)
- c) State five characteristics of cardiac muscle (5 marks)
- d) Describe inspiration. (5 marks)
- e) Explain three main ways that cells can connect with each other (6 marks)
- f) Explain three types of Neurons (6 marks)
- g) Discuss the process of gas exchange in the lungs and tissues (5 marks)
- h) Discuss the neural regulation of ventilation, focusing on the roles of the medulla oblongata and pons in the control of breathing rhythm (5 marks)

SECTION C: LONG ESSAY QUESTION (20 MARKS)

1. With the aid of a diagram, describe the functions of the following parts of a cell. (20 marks)
 - i. Golgi apparatus
 - ii. Mitochondrion
 - iii. Cytoplasm
 - iv. Nucleus
2. With the aid of diagram describe the action potential and resting potential. (20marks)
3. Discuss the hepatobiliary system (20 marks)