



MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS

2023/2024 ACADEMIC YEAR

SECOND YEAR THIRD TRIMESTER

**SCHOOL OF PURE, APPLIED AND HEALTH
SCIENCES**

DIPLOMA IN FOODS, NUTRITION AND DIETETICS

COURSE CODE: DND 2202

**COURSE TITLE: BASIC HUMAN ANATOMY AND
PHYSIOLOGY II**

DATE: 7TH DECEMBER, 2023

TIME: 0830-1130 HRS

INSTRUCTION TO CANDIDATES

Section A: Multiple Choice Questions. Answer ALL Questions

Section B: Short Answer Questions. Answer ALL Questions

Section C: Long Answer Questions. Answer Question ONE and any other ONE question.

This paper consists of 6 printed pages. Please turn over.

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS). SELECT THE CORRECT ANSWER.

1. Which of the following statements best describes the term 'physiology'?
 - A. The microscopic study of tissues and cells
 - B. The study of how the body works.
 - C. All the chemical processes that take place in the organelles of the body's cells.
 - D. The body's automatic tendency to maintain a relatively constant internal environment.
2. Which of the following is the smallest living structural unit of the body?
 - A. Atom
 - B. Molecule
 - C. Organelle
 - D. Cell
3. Which structure controls the endocrine system and integrates the activities of the nervous and endocrine systems?
 - A. The infundibulum
 - B. The pituitary gland
 - C. The thalamus
 - D. The hypothalamus
4. To which of the following does the "tissue level" of structural organization refer?
 - A. Atoms, ions, molecules and electrolytes
 - B. Mitochondria, ribosomes, nucleus, endoplasmic reticulum
 - C. Nephron, alveolus, villus, lobule
 - D. Muscle, nervous, connective, epithelial
5. In the glomerulus, what is the method by which solutes are transferred from the blood to the Bowman's capsule?
 - A. Diffusion
 - B. Active transport
 - C. Secretion
 - D. Filtration
6. By what name is the plasma membrane of a muscle cell known?
 - A. Sarcoplasm
 - B. Sarcomere
 - C. Sarcoplasmic reticulum

- D. Sarcolemma
7. What structure does the blood from the afferent arteriole enter?
- A. The peritubular capillaries
 - B. The vasa recta
 - C. The glomerulus
 - D. Bowman's capsule
8. What is the difference between simple squamous cells and simple columnar cells?
- A. Squamous cells are flattened while columnar cells are taller than they are wide.
 - B. Simple squamous cells are one layer thick while simple columnar cells are several layers thick.
 - C. Simple squamous cells are epithelial tissue while simple columnar cells are connective tissue.
 - D. Squamous cells are flattened while columnar cells are cuboidal.
9. The gastrointestinal tract is lined with
- A. Transitional cells
 - B. Stratified squamous epithelium
 - C. Simple columnar epithelium
 - D. Connective tissue
10. What is the name for the entry point to the kidney for nerves, blood vessels, ureters and lymphatics?
- A. Calyx
 - B. Hilus
 - C. Pelvis
 - D. Pyramid
11. Smooth muscle cells may be described by which of the following?
- A. Striated, voluntary, multinucleate
 - B. Not striated, voluntary, multinucleate
 - C. Striated, involuntary, uninucleate
 - D. Not striated, involuntary, uninucleate
12. What is the effect of antidiuretic hormone on the kidney tubules?
- A. It causes Na⁺ to be absorbed from the filtrate into the tubular cells.
 - B. It causes the concentration of urine to decrease.
 - C. It causes the filtrate volume to increase.
 - D. It causes the walls of the collecting duct to become permeable to water

13. Which of the following is a connective tissue?
- A. Pancreas
 - B. Spinal cord
 - C. Muscle
 - D. Blood
14. Which hormone is produced by the beta cells of the pancreas?
- A. Angiotensin converting enzyme
 - B. Glucocorticoids
 - C. Glucagon
 - D. Insulin
15. Adipocytes are found in which type of tissue?
- A. Muscle tissue
 - B. Epithelial tissue
 - C. Nervous tissue
 - D. Connective tissue
16. What is the function of erythropoietin (EPO)?
- A. Stimulate bone marrow to produce red blood cells
 - B. Decrease the plasma concentration of Ca^{++}
 - C. Increase the plasma concentration of Ca^{++}
 - D. To raise blood sugar level
17. If a cell is said to be "haploid", what is meant?
- A. It has 23 chromosomes
 - B. It has chromosomes that all consist of one chromatid
 - C. It has the "2n" number of chromosomes
 - D. It is not a gamete (or sex cell)
18. What is the function of the epididymis?
- A. Production of sperm.
 - B. Stores sperm and facilitates their maturation.
 - C. Stores sperm and produces seminal fluid.
 - D. Carries semen out through the penis.
19. The neurotransmitter that causes an action potential to occur in a muscle cell membrane is called:
- A. Inorganic phosphate (HPO_4^{2-})
 - B. Adenosine diphosphate (ADP)
 - C. Calcium (Ca^{++})
 - D. Acetylcholine (ach)

20. In which part of a cell does the process of making ATP from oxygen and glucose take place?
- A. Lysosomes
 - B. Ribosomes
 - C. Mitochondria
 - D. Golgi apparatus

SECTION B: SHORT ANSWER QUESTIONS (40 MARKS). ANSWER ALL QUESTIONS.

1. As an anatomy and physiology student, explain the levels of organization in the human body to a classmate who missed the lecture, starting from the smallest to the largest structure (5 Marks)
2. Explain four factors that impact the pH or acid-base balance of urine (8 Marks)
3. With examples, differentiate between endocrine and exocrine glands (6 Marks)
4. Outline five physical changes during muscle contraction (5 Marks)
5. Describe the following conditions of the renal system.
 - i. Nephrotic Syndrome (3 Marks)
 - ii. Acute Renal Failure (2 Marks)
 - iii. Chronic Renal Failure (2 Marks)
6. State the functions of five external anatomical structures of the female reproductive system (5 marks)
7. Describe the distinguishing characteristics between skeletal muscles and smooth muscles. (5 marks)

SECTION C: LONG ANSWER QUESTIONS (40 MARKS).QUESTION ONE IS COMPULSORY, THEN CHOOSE EITHER QUESTION 2 OR 3.

- 1) Homeostasis plays a major role in the proper functioning of the body. The maintenance of homeostasis in the body typically occurs through the use of feedback loops (negative and positive feedback) that controls the body's internal conditions. If homeostasis is successful, life continues; if unsuccessful, disaster or death ensues.

Answer the following questions

- a) Define the term homeostasis (2 Marks)

- b) Contrast between negative and positive feedback giving one physiological example of each mechanism (6 Marks)
- c) Using a diagram explain how a homeostatic control system works (10 Marks)
- d) State two variables in humans that are maintained at a constant level (2 Marks)
- 2) The endocrine system is a complex network of glands and hormones that regulate various bodily functions. It operates without ducts, releasing hormones directly into the bloodstream to communicate with different organs and tissues, helping to maintain overall homeostasis and coordination in the body.
- a) State five processes regulated by the endocrine system (5 Marks)
- b) State the functions of the following hormones secreted by pituitary gland
- i. Anti-Diuretic Hormone (ADH)/Vasopressin (2 Marks)
 - ii. Thyroid Stimulating Hormone (TSH) (2 Marks)
 - iii. Human Growth Hormone (HGH) (2 Marks)
- c) Explain the following disorders of the endocrine system
- i. Type 2 diabetes (3 Marks)
 - ii. Hyperthyroidism (3 Marks)
 - iii. Precocious puberty (3 Marks)
- 3) Covering and lining epithelium serves as the protective outer layer for both the body's external surfaces and certain internal organs. These epithelial sheets envelop external structures such as the skin and internal cavities like blood vessels and pleura. Their primary role is to act as a barrier, separating the body's exterior from its interior and creating a boundary between various internal environments, such as blood and surrounding tissues.
- a) Describe three categories of covering and lining epithelium based on
- i. Arrangement of cell layers (6 Marks)
 - ii. Cell shape (6 Marks)
- b) State four main types of tissues in the human body (4 Marks)
- c) Identify the types of cells found the following tissues
- i. Bone tissue (2 Marks)
 - ii. Vascular tissue (Blood) (2 Marks)

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