



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

(MAIN CAMPUS)

**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

FIRST YEAR MAIN EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE MEDICAL LABORATORY
SCIENCES & MEDICAL BIOTECHNOLOGY**

COURSE CODE: BML 123

COURSE TITLE: SYSTEMIC HUMAN PHYSIOLOGY

DATE: 26TH APRIL 2023

TIME: 8.00 – 10.00AM

INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, **A B** and **C**, carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**). **Answer the questions. DO NOT WRITE ON THE QUESTION PAPER.**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

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This Paper Consists of 4 Printed Pages. Please Turn Over

SECTION A: Multiple Choice Questions (20Marks)

1. Which of the following is the best description of homeostasis?
 - a) Maintenance of body function
 - b) Maintenance of body function at the optimum level at all times
 - c) Multiple systems working cooperatively to maintain body function at an optimum level
 - d) Keeping the body in balance
2. Which of the following is true?
 - a) The regulation of body temperature by sweating involves positive feedback
 - b) Childbirth is a way of maintaining homeostasis
 - c) Uncontrolled bleeding is an example of homeostasis
 - d) A fever in response to infection is NOT a way of maintaining homeostasis
3. Which of the following statements about the ion potential is false?
 - a) The rapid depolarization phase is caused by the entry of potassium ions
 - b) During the repolarization phase, sodium channels open and potassium channels close
 - c) During the depolarization phase, membrane potential becomes positive
 - d) In the after-hyperpolarization phase, membrane potential approaches the potassium equilibrium potential
4. The normal pacemaker of the heart is located in the
 - a) Sinoatrial node.
 - b) Purkinje fibers.
 - c) Atrioventricular node.
 - d) wall of the left ventricle.
5. A 56-year-old woman with severe muscle weakness is hospitalized. The only abnormality in her laboratory values is an elevated serum K^+ concentration. The elevated serum K^+ causes muscle weakness because
 - (a) the resting membrane potential is hyperpolarized
 - (b) the K^+ equilibrium potential is hyperpolarized
 - (c) the Na^+ equilibrium potential is hyperpolarized
 - (d) Na^+ channels are closed by depolarization
6. Hyperventilation before a dive
 - a) Is practised to increase the amount of oxygen in the lung.
 - b) Is not a good idea because it increases the amount of CO_2 in the lungs.
 - c) Causes both CO_2 and O_2 in the blood to increase.
 - d) Causes CO_2 in the blood to decrease whereas O_2 remains unchanged.
7. The largest component of total peripheral resistance in the respiratory system is generated by;
 - a) Larynx and trachea
 - b) Trachea and bronchi
 - c) Terminal bronchi
 - d) Alveolar ducts
8. Increase surfactant production will;
 - a) Decrease oxygen
 - b) Increase surface tension
 - c) Increased breathing work
 - d) Decrease likelihood of alveolar collapse

9. Cardiac arrhythmias during myocardial infarction are possible associated with all of the following except;
- Decrease sympathetic tone
 - Increase extracellular potassium concentration in the ischemic area
 - Reentry
 - Pathologic automaticity
10. Respiratory insufficiency
- Can be induced by overdosing bronchoconstrictory beta mimmeting agents
 - Means respiratory fatigue
 - Is diagnosed on the basis of the blood gas analysis
 - Is always a life threatening situation that could be immediately treated by the use of artificial ventilation
11. Estrogen is secreted during pregnancy, mostly by:
- Maternal ovary
 - Fetal ovary
 - Pituitary
 - Hypothalamus
12. Which of the following is true?
- The regulation of body temperature by sweating involves positive feedback
 - Childbirth is a way of maintaining homeostasis
 - Uncontrolled bleeding is an example of homeostasis
 - A fever in response to infection is NOT a way of maintaining homeostasis
13. If the pancreatic ducts were obstructed, you would expect to see elevated blood levels of
- Bilirubin
 - Amylase
 - Gastrin
 - cholecystokinin
14. Erythropoiesis is stimulated when;
- oxygen flow to the kidney declines
 - oxygen levels in the blood increases
 - both oxygen flow in the blood increase and blood flow to the kidney declines
 - Blood flow to the kidneys decline
15. Which of the following hormones promotes spermatozoa maturation in the testicular germinal epithelium?
- Follicle stimulation hormone
 - Luteinizing hormone
 - Testosterone
 - Androstenedione
16. The renal clearance of a substance?
- Is inversely related to its urinary concentration, U.
 - Is directly related to the rate of urine formation, V.
 - Is directly related to its plasma concentration, P.
 - Must fall in the presence of metabolic poisons.

17. Which of the following control breathing rate in humans?
- Cerebellum
 - Hypothalamus
 - Thalamus
 - Medulla oblongata
18. The mucosal cells of the human colon perform the following functions:
- Converting primary bile acids into secondary bile acids
 - Converting bilirubin into stercobilinogen
 - Absorption of Na⁺
 - Absorption of aromatic amino acids
19. Blood flow to a tissue will increase if the
- Level of oxygen at the tissue increases.
 - Veins constrict.
 - Level of carbon dioxide at the tissue decreases.
 - Arterioles dilate
20. Which of the following is the largest organ in the body?
- Kidneys.
 - Liver.
 - Heart.
 - Brain

SECTION B: Short Answer Questions (40Marks)

- Define the following (5Mks)?
 - Tidal Volume
 - Frank- Sterling principle
 - End diastolic volume
 - End Systolic volume
- Describe the event(s) that take place after the exocytotic release of excitatory neurotransmitters at the synapse (5mks).
- Outline FIVE physiologic function of growth hormones (5Mks)
- Explain the physiologic effects of sildenafil (Viagra) in correcting erectile dysfunction (5Mks)
- Briefly describe body fluid compartmentalization (5mks)
- Briefly describe how chronic gastritis can lead to malabsorption (5Mks)
- Explain the physiologic effects of smoking on pulmonary ventilation in exercise (5Mks)
- Briefly describe negative feedback mechanism in decreased blood pressure (5Mks)

SECTION C: Long Answer Questions (60Marks)

- Describe control of male reproductive function by pituitary glands (20Mks)
- Describe the mechanics of inspiration and expiration (20Mks)
- Describe the formation and composition of Urine in diabetes patients (20Mks)