



(University of Choice)

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

(MAIN CAMPUS)

**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

FOURTH YEAR SECOND TRIMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE, MEDICAL LABORATORY SCIENCES**

COURSE CODE: BML 427

COURSE TITLE: CLINICAL PHYSIOLOGY

DATE: 22/04/2022

TIME: 12.00 -2.00 PM

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

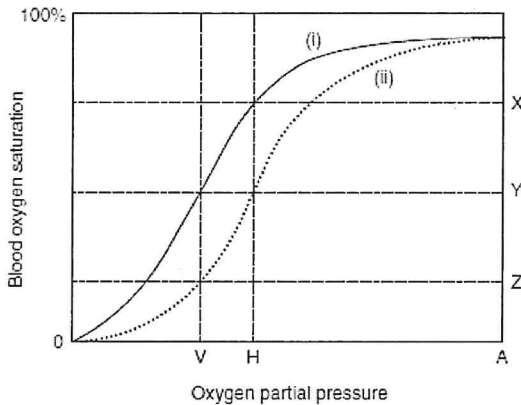
MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over

SECTION A: ANSWER ALL QUESTION (20Mks)

1. Clinically, in an unselected population of individuals, the most sensitive test to detect a disorder of the thyroid gland function is measurement of;
 - a) Free T3
 - b) Free T4
 - c) Total T4
 - d) Free Thyroxine index
2. The commonest preventable cause of mental retardation in the new born is:
 - a) Iodine deficiency
 - b) Phenylalanine hydroxylase deficiency
 - c) Urea cycle defect
 - d) Down syndrome
3. Hyperthyroidism following administration of large amounts of iodine is least likely in an individual with:
 - a) Panhypopituitarism
 - b) Endemic goiter
 - c) Hashimoto's disease
 - d) Graves' disease
4. Physiologic hemodynamic and ECG alteration during exercise stress testing may include;
 - a) Increase in peripheral resistance
 - b) ST elevation
 - c) A decrease in rate pressure product
 - d) An increase in oxygen demand
5. Which of the following statements is correct about chronic hypertension?
 - a) It forces the heart to eject a given volume of blood at an increase rate of oxygen consumption
 - b) The baroreceptors are responsible for producing a chronic hypertension
 - c) It is relatively less dangerous in presence with coronary artery disease
 - d) Restriction salt intake of a person with chronic hypertension tends to increase his/her circulatory volume
6. 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
7. Increase surfactant production will;
 - a) Decrease oxygen
 - b) Increase surface tension
 - c) Increased breathing work
 - d) Decrease likelihood of alveolar collapse
8. Cardiac arrhythmias during myocardial infarction are possible associated with all of the following except;
 - a) Decrease sympathetic tone
 - b) Increase extracellular potassium concentration in the ischemic area
 - c) Reentry
 - d) Pathologic automaticity
9. Respiratory insufficiency
 - a) Can be induced by overdosing bronchoconstrictory beta mimmeting agents
 - b) Means respiratory fatigue

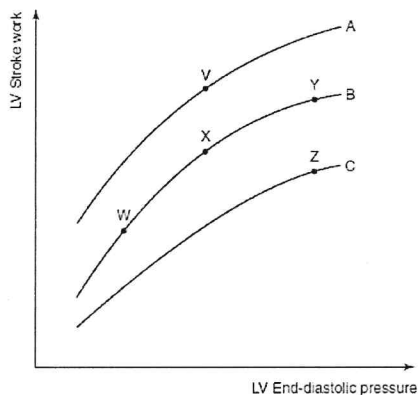
- c) Is diagnosed on the basis of the blood gas analysis
d) Is always a life threatening situation that could be immediately treated by the use of artificial ventilation
10. Which of the following is not appropriate for recording valvular disorders?
a) Echocardiography
b) ECG
c) Valvulography
d) Auscultation
11. Action potential prolongation during cardiac hypertrophy
a) Can be the consequences of reduced K channel function
b) Is responsible for development of increase wall stress
c) Has no effect on intracellular Ca
d) Decrease the occurrence of spontaneous arrhythmias
12. 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
13. If the pancreatic ducts were obstructed, you would expect to see elevated blood levels of
a) Bilirubin
b) Amylase
c) Gastrin
d) cholecystokinin
14. Erythropoiesis is stimulated when;
a) oxygen flow to the kidney declines
b) oxygen levels in the blood increases
c) both oxygen flow in the blood increase and blood flow to the kidney declines
d) Blood flow to the kidneys decline
15. Match the phases on the left (1-3) with the correct description on the right
- | | |
|---------------------|---|
| 1. Intestinal phase | 4. Prepares stomach for arrival of food |
| 2. Gastric phase | 5. Stomach empties and decreases secretions |
| 3. Cephalic phase | 6. Stomach secretes juice and mixes food into chyme |
- a) 1 and 6, 2 and 5, 3 and 4
b) 1 and 5, 2 and 5, 3 and 4
c) 1 and 5, 2 and 4, 3 and 6
d) 1 and 4, 2 and 5, 3 and 6
16. The renal clearance of a substance?
a) Is inversely related to its urinary concentration, U.
b) Is directly related to the rate of urine formation, V.
c) Is directly related to its plasma concentration, P.
d) Must fall in the presence of metabolic poisons.
17. Aldosterone secretion is increased by an increase in plasma?
a) Osmolality.
b) Potassium concentration.
c) Renin concentration.
d) ACTH concentration.
18. Figure below shows two blood oxygen dissociation curves. 'A' represents the oxygen partial pressure in normal alveoli, 'H' the lowered alveolar oxygen pressure in hypoxic lungs due to high altitude or pulmonary disease and 'V' the mixed systemic venous oxygen pressure in the person suffering from hypoxia.



In this diagram the following true EXCEPT:

- If (i) is a normal person's curve, then (ii) is the hypoxic person's curve, rather than vice versa.
- The blood in curve (i) has a higher red cell level of 2,3-diphosphoglycerate (2,3-DPG).
- The O₂ saturation of blood leaving the hypoxic lungs is lower with curve (ii) than with curve (i).
- The curve labelled (i) is more suitable for fetal conditions than the curve labelled (ii).

19. Figure below shows left ventricular (LV) function curves of the Frank-Starling type.



If point X on curve B represents the conditions in the normal heart at rest, then which of the following statement is FALSE? Point:

- Z might represent conditions in the failing ventricle at rest.
 - Y might represent resting conditions in the ventricle in hypertension prior to failure.
 - V might represent conditions in a patient with aortic valve stenosis prior to failure.
 - W might represent the conditions in hypovolemic circulatory failure
20. Which of the following is consistent with a raised blood pH and bicarbonate level?
- Partly compensated respiratory alkalosis.
 - A reduced PCO₂.
 - Chronic renal failure with a raised PCO₂.
 - A history of persistent vomiting of gastric contents.

SECTION B: ANSWER ALL THE QUESTIONS (40Mks)

1. Define the following (4Mks)?

- Clinical Physiology
- Eithoven's law of unipolar leads
- Frank- Sterling principles
- End diastolic volume

2. Mention Five conditions causing ST segment elevation of the ECG recordings (5Mks)
3. Describe briefly the vicious cycle in development of Edema in patients with right ventricle failures (6mks)
4. Explain the mechanism underlying endocrine disorders of the posterior pituitary gland (5Mks)
5. Outline the pathophysiologic mechanisms underlying the formation of ketonuria in diabetes mellitus patients (5mks)
6. Briefly describe five compensatory mechanisms in patients with Heart Failure (5mks)
7. Explain the mechanisms and physiological effects of vomiting (6Mks)
8. Explain the physiologic effects of sildenafil (Viagra) in correcting erectile dysfunction (4Mks)

SECTION C: ANSWER ANY TWO QUESTIONS (40Mks)

1. Describe in details FIVE Factors affecting the Affinity of Hemoglobin for Oxygen during Pregnancy (20Mks)
2. Describe the Ventilatory response to hypoxia, hypercapnia, and severe exercise in patients with Chronic obstruction pulmonary disease (20Mks)
3. Describe the Pathophysiology of Parathyroid Hormone, Vitamin D3, calcitriol in Bone Diseases (20Mks)

