



(University of Choice)

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

(MAIN CAMPUS)

**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

**FIRST YEAR SECOND SEMESTER
MAIN
EXAMINATIONS**

**FOR THE BACHELOR OF SCIENCE
IN
1. MEDICAL LABORATORY SCIENCE
2. MEDICAL BIOTECHNOLOGY**

COURSE CODE: BML 123

COURSE TITLE: SYSTEMIC PHYSIOLOGY

DATE: 22/04/2022

TIME: 8:00-10:00 AM

INSTRUCTIONS:

ANSWER ALL QUESTIONS IN SECTION A, B AND C

USE DIAGRAMS IN YOUR EXPLANATIONS, WHENEVER APPLICABLE

TIME: 2 HOURS

MMUST observes ZERO tolerance to examination
cheating

This Paper Consists of 4 Printed Pages. Please Turn Over

SECTION A: MULTIPLE CHOICE QUESTIONS

[20 MARKS]

1. Mechanisms in the extrinsic control of vascular resistance frequently involve
 - (a) Surface active antigen
 - (b) Myoglobin
 - (c) Angiotensin II
 - (d) Nexus synapse

2. Pneumotaxic respiratory center functionally coordinates with
 - (a) The apneustic center
 - (b) Phrenic centers
 - (c) E neurons
 - (d) Rhythmicity center

3. A molecular agent which is involved in the prevention of the respiratory distress syndrome is
 - (a) Dipalmitoyl lecithin
 - (b) Haemochrome
 - (c) Legumain
 - (d) Aryl sulfatase A

4. Select an odd statement from the following four
 - (a) A new-born girl is born with approximately 300 000 – 400 000 primary oocytes
 - (b) The corpus luteum secretes both oestrogen and progesterone
 - (c) The cumulus oophorus is the mound that supports the ovum in the secondary follicle
 - (d) Meiotic division in the secondary oocyte is halted at metaphase II and is never completed unless fertilisation occurs

5. Which of the following plexuses innervates smooth muscles
 - (a) Serosal plexus
 - (b) Auerch's
 - (c) Myenteric
 - (d) Mucosal plexus

6. CD8+ CTLs release a microbicidal agent called
 - (a) Adra-laminin
 - (b) Vitronectin
 - (c) Granulysin
 - (d) Protectin

7. Which one of the following cells of the gastric glands is CORRECTLY matched its their function
 - (a) Goblet cells – secrete hydrochloric acid
 - (b) Argentaffin cells – secrete serotonin and histamine
 - (c) G cells – secrete pepsinogen
 - (d) Chief cells – secrete mucus

8. Identify a CORRECT statement about antigen processing and presentation pathways
 - (a) Cytosolic and nuclear antigens are presented in the context of MHC class I molecules

- (b) Extracellular proteins are degraded in the proteasome complex
 - (c) Intracellularly produced proteins are degraded in the lysosomes and endosomes
 - (d) Cytosolic antigens are coupled to ubiquitin before being loaded onto MHC class II molecules
9. Select a substance that inhibits the process of angiogenesis
- (a) Platelet factor 4
 - (b) Angiogenin
 - (c) Interleukin-18
 - (d) Acidic fibroblast growth factor (FGF)
10. Annual hydroxyapatite turn over in children is
- (a) 25%
 - (b) 21%
 - (c) 50%
 - (d) 15%
11. One agent involved in urine release is
- a) CNS-Spinal reflexes
 - b) Occipital reflexes
 - c) Theca interna
 - d) Cortical-smooth muscle impulses
12. Which one of the following hormones demonstrate potency post-ovulation
- (a) Relaxin
 - (b) Androgen binding protein (ABP)
 - (c) LH
 - (d) FSH
13. Identify an angiogenic inhibitor
- (a) A fragment of prolactin
 - (b) Heparin
 - (c) IL 23
 - (d) Tachykinin
14. A cardiogenic shock can result from
- (a) Heart murmurs
 - (b) Inhibins
 - (c) Low output
 - (d) Volumetric contraction
15. An example of a molecular motor superfamily is
- (a) Cytoplasmic Tac
 - (b) NK-kB
 - (c) Myosin
 - (d) Trp-Ser X
16. In neuronal fiber regeneration
- (a) Peripheral nerve damage is irreversible
 - (b) Axonal severing leads to sympathectomy
 - (c) Immunoglobulin super families support metrical growth
 - (d) Some neurotrophins impede distal stumps
17. In genetic muscle disorders
- (a) There is muscle over-excitation
 - (b) Mutant genes lead to muscle breakdown
 - (c) Metabolic myopathies are less evident

(d) Mechanical and electrical responses are symmetrical

18. The bacterially origination neurotoxins

- (a) Cause flaccid paralysis leading to jaw-locking
- (b) Block Ach release at neuromuscular junctions
- (c) Disrupt some CNS synapses
- (d) Act on synaptobrevin

19. One feature of the spermatic arteries is

- (a) Is composed of primitive germ cells and leydig cells
- (b) They are tortuous
- (c) Blood flow resembles pampiniform plexus flow
- (d) Is impermeable to steroids

20. One aspect involved in the cytosolic pathway of antigen processing and presentation is

- (a) Endosomes
- (b) Lysosomes
- (c) Proteosome complex
- (d) Membrane proteins

SECTION B: SHORT ANSWER QUESTIONS

[40 MARKS]

1. Give the functions of the **Human chorionic gonadotropin** (4 marks)
2. Outline features thyrocalcitonin and PTH (4 marks)
3. What are the functions of gastrin, CCK, GIP, VIP, Motilin, somatostatin, and secretin (4 marks)
4. Explain mechanisms involved in the migrating motor complex (MMC) (4 marks)
5. Explain the importance of uterine secretion of sterolbinding albumin, lipoproteins, and proteolytic and glycosidase enzymes. (4 marks)
6. Outline homeostatic control of stable pH balance and bicarbonate (4 marks)
7. Identify the functions **Pulmonary surfactant** is a surface-active lipoprotein complex (4 marks)
8. Describe functions of bradykinin, prostaglandins and angiotensin in blood pressure regulation (4 marks)
9. Describe the BBB physiological mechanisms (4 marks)
10. Identify neurons involved in the mammalian breathing process (4 marks)

SECTION C: LONG ANSWER QUESTIONS

[60 MARKS]

1. Give the functional mechanisms of the renin–angiotensin–aldosterone system. (20 marks)
2. Discuss bone growth, resorption and remodeling mechanisms (20 Marks)
3. Provide an account of fibrillation and pacemaking mechanisms of the CCS. (20 marks)