(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(MAIN CAMPUS)

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER
SPECIAL/SUPPLEMENTARY EXAMINATIONS

FOR THE BACHELOR OF SCIENCE
IN
MEDICAL LABORATORY SCIENCES

COURSE CODE: BML 113

COURSE TITLE: FUNDAMENTALS OF PHYSIOLOGY

DATE: 4TH DECEMBER 2019 TIME: 9:00-11:00 AM

INSTRUCTIONS:
ANSWER ALL QUESTIONS
TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 6 Printed Pages. Please Turn Over

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. Which one of the following statements concerning serous membranes is **UNTRUE**
    (a) Serous membranes secrete fluids that fill the space between parietal and visceral membranes.
    (b) The parietal part of the serous membrane covers the internal organs
    (c) The peritoneal membranes line the abdominopelvic cavity and cover its organs
    (d) Retroperitoneal organs are found behind the parietal peritoneum

2. Identify a body plane that divides the body into the anterior and posterior parts
    (a) The transverse plane
    (b) The sagittal plane
    (c) The longitudinal plane
    (d) The frontal plane

3. Identify a component that is NOT directly involved in the maintenance of the integrity of DNA
    (a) DNA ligase
    (b) RNA polymerase
    (c) Topoisomerase
    (d) Histones

4. Select a statement which is TRUE of the ribosomes
    (a) Each ribosomal subunit is composed of a case of ribosomal DNA surrounded by ribosomal proteins.
    (b) Proteins are assembled in the ribosomes by translation of tRNA by ribosomal mRNA and a group of related proteins.
    (c) RNA molecules (tRNA and rRNA) play an important part in the catalytic activity of ribosomes.
    (d) The process of transcription occurs in the ribosomes.

5. The catabolic process involving the degradation of the cells own components through lysosomal machinery is called
    (a) Apoptosis
    (b) Cell signalling
    (c) Autophagy
    (d) Phagolysis

6. Which special proteins form small transmembrane passageways that enable solute molecules to cross the phospholipid bilayer.
    (a) The glycocalyx
    (b) External lipoprotein

(c) Permeases

(d) Peripheral proteins

7. All of the following are components that make up the extracellular fluid compartment except

(a) The interstitial fluid

(b) Plasma

(c) Transcellular fluid

(d) Cytosol

8. Which one of the following statements is WRONG with regard to the pineal gland

(a) It secretes hormone melatonin and is cone-shaped

(b) It causes drowsiness and increases body temperature through hormonal secretion.

(c) Its hormonal secretion enhances the production of cytokines in the immune system

(d) It is located near the corpora quadrigemina

9. Which group of hormones stimulates protein synthesis, promotes maturation of the nervous system and increases the rate of energy utilization from the body.

(a) Parathyroid hormones
(b) Gonadotrophic hormones
(c) Thyroid hormones
(d) Pituitary hormones

10. In the human digestive tract the gastric glands contain

(a) Argentaffen cells which secrete serotonin and histamine

(b) Pariental cells which secret gastrin

(c) Goblet cells which secrete hydrochloric acid

(d) Chief cells which secrete mucus

11. Identify the combination that DOES NOT entirely contain functions of the digestive system.

(a) Ingestion, mastication, defecation

(b) Peristalsis, deglutition, micturition

(c) Absorption, peristalsis, deglutition

(d) digestion, peristalsis, deglutition

12. After antigenic stimulation, T lymphocytes proliferate and differentiate to form the following clones of cells except.

(a) Memory T cells

(b) Suppressor T cells

(c) Plasma cells

(d) Cytotoxic T cells

13. In the vestibular apparatus that maintain equilibrium
    (a) Semicircular canals give information on linear acceleration
    (b) The utricle and saccule provide information about angular acceleration
    (c) The receptors for equilibrium are 20 to 50 kinocilia
    (d) The membranous labyrinth in the vestibular apparatus contains the endolymph

14. For pitch discrimination to occur in the hearing process, high sound frequencies are directly transmitted through.
    (a) The endolymph in the cochlea duct
    (b) The perilymph-containing scala vestibule
    (c) The perilymph-containing scala tympani
    (d) The vestibular membrane and the basilar membrane

15. As photoreceptors, the rods are known to
    (a) Absorb light maximally in the red region of the electromagnetic spectrum
    (b) Contain a pigment called rhodopsin that is responsible for colour vision.
    (c) Contain rhodopsin pigment that transmits light in the red and green regions of the visible spectrum.
    (d) Provide black and white vision under conditions of low light intensity.

16. Which one of the following statements is TRUE with regard to the eyes ability to transduce energy in the electromagnetic spectrum into nerve impulses?
    (a) Only electromagnetic energy with wavelengths between 200 and 400 nanometres (nm) comprises visible light.
    (b) Individuals without lenses can see light within the infrared region of the spectrum
    (c) The ultraviolet wavelength of light is only felt as heat by the eyes
    (d) The yellow colour of the lens has the ability to filter out the high energy ultra violet light.

17. Identify a regulatory measure which DOES NOT apply with regard to the inhibition of catecholamine neurotransmitters.
    (a) Enzymatic degradation by acetylcholinesterase
    (b) Re-uptake of the catecholamines at the presynaptic end
    (c) Enzymatic degradation by MAO (monoamine oxidase) from the presynaptic knobs
    (d) Enzymatic degradation by COMT (Catecholamine -0- methyl transferase) from the post synaptic knob.

18. Which receptors are usually stimulated by the release of chemicals from damaged tissue cells leading to pain sensation.
    (a) Chemoreceptors
    (b) Nocioreceptors

(c) Mechanoreceptors

(d) Extreroreceptors

19. Which one of the following is NOT a direct homeostatic function of the kidney

(a) Maintaining carbohydrate metabolism

(b) Regulation of blood pH

(c) Re-absorption of substances like water and sodium ions into the blood

(d) Excretion of urea and other wastes

20. The human B lymphocytes

(a) Are manufactured in the bone marrow and then processed in the thymus gland

(b) Play the role of antibody (immunoglobulin) mediated immunity

(c) Differentiate to form suppressor cells and plasma cells on encountering antigens

(d) Require Antigen Processing Cell (APC) mediation in order to be sensitized by antigen

SECTION B: SHORT ANSWER QUESTIONS [40 MARKS]

1. Describe the hearing process, organization and roles played by the vestibular apparatus in the

2. With examples, outline positive and negative feed back homeostatic regulation mechanisms **(4 marks)**

4. Describe the electrical and contractile activities of skeletal muscles (use diagrams) **(5 marks)**

5. Describe any two sleeping disorders **(4 marks)**

6. Outline the mechanism of body fluid balance and blood pressure regulation by the RAAS (Renin Angiotensin Aldosterone System) **(10 marks)**

7. Discuss antigen a processing and presentation pathways of the immune system **(8 marks)**

SECTION C: LONG ANSWER QUESTIONS [60 MARKS]

1. Explain the stages involved in urine formation and key outcomes of proper kidney functioning **(20 marks)**

2. Explain the compartmentalization of the body fluids **(20 marks)**

3. Explain properties and Excitation mechanisms that take place in skeletal muscles **(20 marks)**