



(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(MAIN CAMPUSES)

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

END OF SEMESTER EXAMINATIONS

FOR

**1. THE BACHELOR OF SCIENCE
IN MEDICAL LABORATORY SCIENCES**

COURSE CODE: BML 123

COURSE TITLE: SYSTEMIC HUMAN PHYSIOLOGY

DATE: 9TH DECEMBER 2020

TIME: 8:00-10:00 AM

INSTRUCTIONS:

ANSWER ALL QUESTIONS IN THIS EXAMINATION

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. Which one of the following hormones is important in the development of spermatogonia into spermatids
 - (a) Relaxin
 - (b) Androgen binding protein (ABP)
 - (c) Testosterone
 - (d) None of the above

2. Which one of the following statements is NOT TRUE concerning osteoblasts / osteoclasts
 - (a) Osteoblasts are the bone forming cells formed from stromal cell precursors
 - (b) Osteoblasts differentiate into osteocytes in the bone lacunae
 - (c) Osteoblasts erode and resorb previously formed bones
 - (d) Osteoclasts dissolve collagen for the bone matrix

3. The masculinising hormones in the human body are categorised as
 - (a) Androgens
 - (b) Inhibins
 - (c) Oestrogens
 - (d) Gonadotropins

4. In sex determination, when a sperm containing the X chromosome fertilizes an ovum
 - (a) A genetic female will be formed
 - (b) A genetic male will be formed
 - (c) Seminiferous tubule dysgenesis arises
 - (d) There is female pseudo-hermaphroditism

5. The atrioventricular valves
 - (a) Open during ventricular relaxation
 - (b) Include the tricuspid and semilunar valves
 - (c) Are two-way valves that blood to flow from the atria to the ventricle
 - (d) Are located at the origin of the pulmonary artery

6. Select a role which is NOT one of the transportation roles of the blood and cardiovascular system
 - (a) Respiratory transport
 - (b) Nutritive transport
 - (c) Deglutition transport
 - (d) Excretory transport

7. The following statements are FALSE about the nephrons EXCEPT
 - (a) The cup-shaped Bowman's capsule encloses blood capillaries called loops of Henle
 - (b) A majority of them are juxtamedullary nephrons
 - (c) The proximal convoluted tubule directly connects to the collecting duct
 - (d) A kidney contains approximately one million nephrons

8. All the following are physical properties of the normal lungs EXCEPT
 - (a) Compliance
 - (b) Fibrosis
 - (c) Surface tension

- (d) Elastic
9. Which one of the following is not a specialised function of the digestive system
- (a) Deglutition
 - (b) Mastication
 - (c) Absorption
 - (d) Hormonal regulation
10. The following statements are FALSE concerning the female reproductive system EXCEPT
- (a) A new-born girl is born with approximately 300 000 – 400 000 primary oocytes
 - (b) The corpus luteum secretes oestrogen only
 - (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 prophase I and is never completed unless fertilisation occurs
11. The kidney's urine formation function involves the following processes EXCEPT
- (a) Filtration
 - (b) Secretion
 - (c) Selective reabsorption
 - (d) Micturition
12. Natural killer cells release the following microbicidal agents EXCEPT
- (a) Granzymes
 - (b) Vitronectin
 - (c) Perforin
 - (d) Alpha defensins
13. Which one of the following cells of the gastric glands is INCORRECTLY matched with their function
- (a) Goblet cells – secrete mucus
 - (b) Argentaffin cells – secrete serotonin and histamine
 - (c) G cells – secrete hormone gastrin
 - (d) Chief cells – secrete hydrochloric acid
14. Identify a CORRECT statement concerning the T and B lymphocytes
- (a) They are both matured in the bone marrow
 - (b) T lymphocytes secrete immunoglobulins
 - (c) B lymphocytes require APC - processed antigenic peptides for their stimulation to occur
 - (d) They both differentiate to produce effectors that include memory cells
15. Select a substance that promotes the process of angiogenesis
- (a) Platelet factor 4
 - (b) Heparin
 - (c) 16 KD fragment of prolactin
 - (d) Acidic fibroblast growth factor (FGF)
16. Select a resultant effect of decreased extracellular calcium (Ca^{2+}) at the myoneural junction
- (a) Excitatory effect on nerve and motor nerve fibers
 - (b) Hypocalcemic tetany due to reduced activity of motor nerve fibers
 - (c) Laryngospasm without fatal asphyxia
 - (d) Reduced skeletal muscle spasms

17. Identify a statement which is TRUE about the origin of the heart beat and the electrical activity of the heart
- The atrioventricular node acts as the pacemaker that determines the heart rate
 - The myocardium is capable of spontaneous discharge even under normal conditions
 - Impulses pass through the Purkinje's system then into the bundle of His
 - The sinoatrial node discharges most rapidly thereby spreading depolarisation
18. In the intestinal absorption of calcium
- Active transport occurs in a brush border system
 - Passive diffusion is hardly involved
 - Phosphates and oxalates can increase the calcium absorption rate
 - Absorption is regulated by calcitonin
18. Select a substance which is NOT contributed into semen by the seminal fluid from the seminal vesicles
- Spermine
 - Ascorbic acid
 - Flavins
 - Phosphorylcholine
20. Spermatogenesis
- Occurs within the interstitial tissues of Leydig
 - Requires a temperature of 35°C in order to occur efficiently
 - Is a process that is supported by both androgen FSH effects
 - Results in the production of fully capacitated sperms

SECTION B: SHORT ANSWER QUESTIONS

[40 MARKS]

- Briefly describe the functions of the active metabolite calcitriol (4 marks)
- Outline the functions of the circulatory (blood and cardiovascular) system (4 marks)
- Identify and distinguish between the two respiratory centers that are found in the pons (4 marks)
- Describe the signal requirements for lymphocyte activation (4 marks)
- Identify and describe the two major types of contractions that occur in the small intestines (4 marks)
- Outline the organization of the gastrointestinal tract tunics (4 marks)
- Apart from regulation of pH balance and urine formation, list the other functions that the
- Describe how the kidneys are able to regulate pH balance in the body (4 marks)
- Describe the roles played by androgens and the follicle stimulating hormone (FSH) in the maintenance of the gametogenic functions of the testes (4 marks)
- Discuss the natural antimicrobial substances involved in non-specific host defense against microbes (4 marks)

SECTION C: LONG ANSWER QUESTIONS

[40 MARKS]

- Discuss the effects of agents in the extrinsic control of vascular resistance and blood flow and angiogenesis (20marks)
- With the aid of a diagram, describe the development of the female germ cells (oogenesis) from the embryonic period of development up to the formation of the secondary oocyte (20 marks)