(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(MAIN CAMPUSES)

UNIVERSITY EXAMINATIONS 2018/2019 ACADEMIC YEAR

SPECIAL/SUPPLEMENTARY EXAMINATIONS

FOR

1. THE BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCES

2. THE BACHELOR OF SCIENCE IN HUMAN NUTRITION AND DIETETICS

COURSE CODE: BML 123 /HND 208

COURSE TITLE: SYSTEMIC HUMAN PHYSIOLOGY/ PHYSIOLOGY II

DATE: 18TH MAY 2019 TIME: 9:00-11:00 AM 80 STUDENTS

INSTRUCTIONS:

ANSWER ALL QUESTIONS IN THIS EXAMINATION

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

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 in 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) Argentaffen 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
    (a) The atrioventricular node acts as the pacemaker that determines the heart rate
    (b) The myocardium is capable of spontaneous discharge even under normal conditions
    (c) Impulses pass through the Purkinje's system then into the bundle of His
    (d) The sinoatrial node discharges most rapidly thereby spreading depolarisation

18. In the intestinal absorption of calcium
    (a) Active transport occurs in a brush border system
    (b) Passive diffusion is hardly involved
    (c) Phosphates and oxalates can increase the calcium absorption rate
    (d) Absorption is regulated by calcitonin

18. Select a substance which is NOT contributed into semen by the seminal fluid from the seminal vesicles
    (a) Spermine
    (b) Ascorbic acid
    (c) Flavins
    (d) Phosphrylcholine

20. Spermatogenesis
    (a) Occurs within the interstitial tissues of Leydig
    (b) Requires a temperature of 35^0C in order to occur efficiently
    (c) Is a process that is supported by both androgen FSH effects
    (d) Results in the production of fully capacitated sperms

SECTION B: SHORT ANSWER QUESTIONS [40 MARKS]

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

SECTION C: LONG ANSWER QUESTIONS [40 MARKS]

1. Discuss the effects of agents in the extrinsic control of vascular resistance and blood flow and angiogenesis

   (20marks)

2. 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)**