UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCE

FINAL EXAMINATION, MAY 2013

COUESE TITLE: **PRINCIPLES OF ANATOMY AND PHYSIOLOGY**

COURSE CODE: **EHM 108**

TIME ALLOCATED: **TWO (2) HOURS**

MARKS ALLOCATED: **75**

INSTRUCTION:

- **THERE ARE SEVEN (7) PRINTED PAGES EXCLUDING COVER PAGE**
- **THERE ARE 2 SETIONS, A AND B:**
  - **SECTION A WITH MULTIPLE CHOICE QUESTIONS**
  - **SECTION B WITH 2 SHORT ESSAYS**

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO BY THE INVIGILATOR

SECTION A: MULTIPLE CHOICE QUESTIONS (35 MARKS)

For each question, choose the most appropriate response and write in your answer sheet the corresponding letter only, in **capital letters**. Each correct response carries 1 mark.

1. Which of the following best defines Physiology?
   A. The study of the physical aspects of the human body
   B. The study of the basic unit of life
   C. The study of body function
   D. The study of the structural components of the body

2. In the language of anatomy, and specifically osteology, 'a process' refers to a _____.
   A. Depression
   B. Protrusion
   C. A series of steps
   D. An act of doing something

3. The fontanel bound by the frontal bone and the two parietal bones is known as the _____ fontanel.
   A. Parietal
   B. Frontal
   C. Suture
   D. Anterior

4. Functions of the skin include_____.
   A. Serving as a reservoir for blood
   B. Regulating temperature
   C. Allowing oxygen to get into the body
   D. A and B

5. Skin colour may be influenced by _____.
   A. The volume of water in the body.
   B. Amount of oxygen in the body
   C. The amount of food that you each day
   D. None of the above

6. Which of the following is a typical example of connective tissue?
   A. Muscle
   B. Blood
   C. Skin
   D. A and B

7. The appendicular skeleton consists of _____
   A. the upper and lower limbs
   B. the tibia
   C. the sternum
   D. A and B

8. Which of the following cell structures has DNA?
   A. Mitochondria
   B. Ribosome
   C. Golgi apparatus
   D. None of the above

9. Elderly people are more prone to fractures mainly because _____.
   A. Most of their bone cells would have died.
   B. The amount of water in the bones has increased, thereby weakening the bone.
   C. Bone resorption has exceeded bone deposition thereby weakening the bone.
   D. The amount of food they eat usually become less, depriving the bone of important minerals for strength.

10. The basic unit of muscle cell contraction is called a _____
   A. Sarcomere
   B. Motor unit
   C. Neuron
   D. ATP

11. As a skeletal muscle relaxes, following a contraction, _____.
   A. Thick and thin filaments slide
   B. Energy is used

C. The muscle length increases

D. All of the above

12. Primarily why does blood flow in one direction within the cardiovascular system?

A. The difference in pressure of the blood is always in one direction

B. The heart pumps in one direct

C. Some chambers of the heart are smaller than the others

D. There are valves to prevent backflow of blood

13. Why do most people feel sleep after having a meal? Because _____.

A. Some nutrients inhibit function of neurons in the brain

B. Food stimulates the parasympathetic system

C. Stretching of the stomach tires the body and induce sleep and rest

D. It is only hunger which activates people

14. Ben touched a hot plate and quickly withdrew his hand by flexing/bending the elbow joint without having to think. In this scenario or action, _____.

A. There is no integrator

B. The bicep muscle is the effector

C. The endocrine system coordinated the action

D. A and B

15. One of the roles of the ear in the body is to _____.

A. Prevent infection

B. Maintain balance

C. Supply oxygen to the brain

D. None of the above

16. The peripheral nervous system consists of _____.

A. Unmyelinated neurones only

B. Afferents and Efferents

C. The autonomic and somatic nervous system

D. B and C

17. A boy was pricked by a pin on the thumb of the right hand. Which part of the brain registered the sensation of the prick?

A. Cerebellum

B. Left cerebral hemisphere

C. Right cerebral hemisphere

D. All parts of the brain

18. How do hormones work?

A. By binding onto cell surface receptors

B. By binding onto intracellular receptors

C. By stimulating release of neurotransmitters

D. A. and B.

19. Which of the following is part of the body's immune system?

A. Skin

B. Central nervous system

C. Red blood cells

D. None of the above

20. Sam sustained an ankle sprain during a soccer match. Moments later the ankle was swollen, painful, reddish in appearance and warm on touch. How would you perceive this response?

A. The injury is extremely severe and chances of recovery are slim

B. Sam lacks some important nutrients and protein found in healthy people

C. This is a normal immune response to tissue damage

D. Sam is abnormally sensitive to injuries

21. A person with blood group AB can receive blood only from someone with which blood group?

A. O only

B. AB only

C. A or B only

D. All blood group

22. One of the processes which take place in the nephron is _____.

A. Excretion of sodium from the blood

B. Breaking down toxins in the blood

C. Breaking down of proteins

D. Synthesis of glycogen from glucose

23. The primary function of fats in the body is to _____.

A. Build up body tissue

B. Serve as energy reserves

C. Form proteins that then build the body

D. Transport nutrients in the blood

24. Which of the following is correct about the digestive system?

A. Chemical digestion starts from the stomach downwards

B. The processes of digestion is only completed inside individual body cells

C. Not everything that we eat can be digested

D. All of the above

25. How does the body maintain a constant pH?

A. By digesting and absorbing only the nutrients with the wanted pH

B. Through immune response to abnormal pH.

C. Through buffer systems.

D. Through the skin

State whether each of the following statements is true (T) or false (F), and write the corresponding letter only, in **capital letters**, e.g. 12 B. Each correct response carries 1 mark.

26. All the blood from the stomach and intestines goes to the liver first before going to the heart.

27. The only neurotransmitters found in the central nervous system are acetylcholine and adrenaline

28. Platelets are white blood cells responsible for clotting

29. Under normal circumstances, all energy used in the body is in the form of ATP

30. Neurons with a larger diameter transmit impulses faster than those with a small diameter.

31. Phospholipids transport polar molecules across a cell membrane

32. An epithelial cell does not have a nucleus.

33. All ribs are attached to the sternum anteriorly

34. All mitochondria in an individual originate from the mother

35. The respiratory system assists in the maintenance of acid-base balance in the body

SETION B: SHORT ESSAY QUESTIONS (40 MARKS)

Question 1

1.1 You are an occupation and health safety officer at a hotel, where workers often work long shifts. Majority of the employees are ladies, and some of them prefer wearing flat shoes while some prefer high-heeled shoes. Based on your knowledge of principles of anatomy and physiology, what would you recommend? Justify your answer in detail, with illustrations where possible.

[7]

1.2 You are driving very fast down Malagwane hill with a group of colleagues. Majority of them started to experience some impairment in hearing, and some citing some pain in the ears.

- How would you explain this experience in terms of anatomy and physiology to allay their anxiety?
- What advice would you give in order to alleviate the problem and maintain optimum body structure and function? Explain your answer.

[7]

1.3 Trace the flow of blood from the moment it leaves the left ventricle of the heart until it comes back again to this chamber, stating the main valves, major blood vessels and heart chambers which it passes through. Present your response in the form of a flow diagram, e.g.:

Sensor receptor

↓

Spinal cord

↓

Brain

↓

[6]

[Sub-total 20 marks]

Question 2

2.1 Compare and contrast structurally and functionally the sympathetic and the parasympathetic nervous systems. [8]

2.2 The primary function of the respiratory system is to **efficiently deliver clean and safe air** from the atmosphere to the tissues. Describe and explain any anatomical features or adaptations of the system which enable it to perform this task. [12]

[Sub-total 20 marks]