

UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES

FINAL EXAMINATION

MAY 2017

COURSE CODE: EHS 108
TITLE OF PAPER: PRINCIPLES OF ANATOMY AND PHYSIOLOGY
DURATION: 2 HOURS
MARKS: 100

INSTRUCTIONS

- 1. THIS PAPER CONSISTS OF TWO (2) SECTIONS: SECTION 1 – MULTIPLE CHOICE AND SECTION 2 – ESSAY QUESTIONS.**
- 2. ANSWER ALL QUESTIONS IN SECTION ONE AND THREE QUESTIONS IN SECTION TWO.**
- 3. READ QUESTIONS AND INSTRUCTIONS CAREFULLY.**
- 4. EACH QUESTION IN SECTION TWO IS TO BE ANSWERED ON A SEPERATE SHEET OF PAPER.**

THIS PAPER IS NOT TO BE OPENED UNTIL THE INVIGILATOR HAS GRANTED PERMISSION.

SECTION 1

Instructions: For each of the following questions/statements, choose the most appropriate response and write the question number and corresponding letter in your answer sheet, in capital letters, e.g. 26. B. Each correct response carries 1 mark.

1. What is the sequence of a negative feedback mechanism?

- i. Control centre
- ii. Effector
- iii. Receptor
- iv. Response
- v. Stimulus.

Arrange them in the correct order as they operate to maintain homeostasis.

- A. ii, i, iii, iv, v
- B. ii, iii, v, i, iv
- C. iii, ii, i, v, iv
- D. iii, v, i, ii, iv

2. Which of these descriptions does **NOT** apply to a person in an anatomic position?

- A. Standing erect
- B. Head facing forward
- C. Arms hanging to the side
- D. Palms facing toward the thighs

3. The elbow is ----- to the wrist

- A. Distal
- B. Proximal
- C. Lateral
- D Medial

4. The largest molecules that make up the cell membrane are _____

- A. Carbohydrates, nucleic acids, and proteins
- B. Carbohydrates, water, and nucleic acids
- C. Phospholipids, cholesterol, and proteins
- D. Water, carbohydrates and cholesterol

5. Which of these substances diffuse directly through the lipid bilayer of a cell membrane?
- A. Glucose and amino acids
 - B. Na^+ and Cl^-
 - C. O_2 and CO_2
 - D. Whole cells
6. Which one of these processes illustrates a positive-feedback mechanism?
- A. Increase in respiratory rate during exercise
 - B. Increase in heart rate when blood pressure decreases
 - C. Shivering when body temperature decreases
 - D. Increase in uterine contractions when uterine stretching increase during childbirth
7. Which type of a tissue is designed to stretch?
- A. Epithelial
 - B. Connective
 - C. Muscle
 - D. Nervous
8. The specific layer that shapes the ridges for fingerprints and footprints is the -----
- A. Hypodermis
 - B. Papillary layer
 - C. Reticular layer
 - D. Superficial muscle layer
9. A membrane junction that communicates between adjacent cells is known as -----
- A. Desmosome junction
 - B. Tight junction
 - C. Gap junction
 - D. Connexon junction
10. Which of the following is the correct definition of pinocytosis?
- A. Vesicular transport process that ejects substances from intracellular to extracellular space
 - B. Movement of substances from extracellular to intracellular environment
 - C. Movement of very small extracellular fluid into the intracellular space
 - D. Movement of substances into, across and out of the cell

11. Which of these bone types is **NOT** matched with the correct example?

- A. Long bone - humerus
- B. Short bone - clavicle
- C. Flat bone - scapula
- D. Irregular bone - vertebrae

12. Given these following events:

- i. Acetylcholine is released from synaptic vesicles
- ii. An action potential reaches the presynaptic terminal
- iii. Ca^{2+} ions diffuse into the cell
- iv. Acetylcholine is secreted from the presynaptic terminal by exocytosis

Choose the arrangement that chronologically list the events that occur when an action potential travels through the axon of a motor neuron.

- A. i, ii, iii, iv
- B. i, iii, iv, ii
- C. ii, i, iii, iv
- D. ii, iii, i, iv

13. Given these following events:

- i. Acetylcholine binds to receptors on the postsynaptic membrane
- ii. Acetylcholinesterase breaks down acetylcholine
- iii. Choline is reabsorbed by presynaptic membrane
- iv. Depolarization of postsynaptic membrane occurs
- v. Ligand (chemically)-gated Na^+ ion channels open

Choose the arrangement that lists the events in order they occur when an action potential travels through the axon of a motor neuron to a postsynaptic membrane.

- A. i, ii, iv, v
- B. i, v, iv, ii
- C. ii, i, iv, v
- D. iv, ii, i, v

14. All of the following features can be seen in the brain tissue of a person suffering from Alzheimer's disease **EXCEPT** _____.
- A. Shrinkage of all the brain tissue
 - B. Toxic beta amyloid peptide
 - C. Increased level of acetylcholine in the basal forebrain
 - D. Tau proteins
15. Pink eye is caused by an infection that produces an inflammation of the _____.
- A. Cornea
 - B. Tarsal glands
 - C. Lacrimal glands
 - D. Conjunctiva
16. The conjunctival mucous membrane covers _____.
- A. The inner surface of the eyelids only
 - B. The whole outer surface of the sclera
 - C. The inner surface of the sclera
 - D. Both the inner surface of the eyelids and the visible portion of the sclera
17. When a person cries, he or she tends to keep on wiping his dripping nose. The nose drips because _____.
- A. Lacrimal gland secretions wash the eyeball and drain into the lacrimal duct, which empties into the nasal cavity
 - B. Olfactory mucosa is sensitized to increase secretions into the nose
 - C. Special secretory glands in the nose start to produce secretions into the nose
 - D. The eyeball produces tears that drain into the lacrimal canal and then into the nose
18. The accessory structures of the eye include all of the following **EXCEPT** _____.
- A. Eyebrows
 - B. Cornea
 - C. Eyelids
 - D. Lacrimal glands

19. A chemical classification of hormones includes _____.
- A. Amino-acids and steroids based hormones
 - B. Amino acids and thyroid based hormones
 - C. Steroids and gonad hormones
 - D. Cholesterol-containing and gonad hormones
20. Which of the following elements is required for the synthesis of a thyroid hormone?
- A. Iron
 - B. Iodine
 - C. Zinc
 - D. Sulphur
21. The metabolic rate of most tissues is controlled directly by _____.
- A. Adrenocorticotrophic hormone (ACTH)
 - B. Thyroid hormone (TH)
 - C. Thyroid stimulating hormone (TSH)
 - D. Antidiuretic hormone (ADH)
22. Eicosanoids are not true hormones because they _____.
- A. Are lipid in nature
 - B. Don't have target organs
 - C. Mediate inflammatory reactions
 - D. Act locally, not on distal organs
23. Micturition is the -----
- A. Production of urine
 - B. Secretion of acid
 - C. Sacral reflex in infants
 - D. Act of emptying the urinary bladder

24. The basic functional unit of a kidney is the -----
- A. Loop of Henle
 - B. Nephron
 - C. Glomerulus
 - D. Renal corpuscle
25. The glomerular capsule and glomerulus make up the -----
- A. Renal corpuscle
 - B. Loop of Henle
 - C. Nephron
 - D. Collecting system
26. When the concentration of ADH increases, -----.
- A. More salt is excreted by the nephron
 - B. Less urine is produced
 - C. The specific gravity of the urine decreases
 - D. More urine is produced
27. Which of the following is the muscular tube delivering urine to the bladder?
- A. Urethra
 - B. Ureter
 - C. Renal pelvis
 - D. Papillary duct
28. Which substance is **NOT** normally expected in urine?
- A. Chloride
 - B. Nitrogenous waste
 - C. Protein
 - D. Water

29. Arrange the following structures in the correct sequence in which urine passes through them to the external environment:

- i. Ureter
- ii. Renal pelvis
- iii. Calyx
- iv. Urinary bladder
- v. Urethra

- A. ii, iv, iii, v
- B. iii, iv, i, v, ii
- C. i, ii, iii, iv, v
- D. iii, ii, i, iv, v

30. The presence of glucose and ketone bodies in the urine can indicate -----

- A. Albuminuria
- B. Infection of the urinary tract
- C. Trauma to the kidneys
- D. Untreated diabetes mellitus

31. All of the following are carried out in the renal tubules **EXCEPT** _____

- A. Reabsorption
- B. Filtration
- C. Formation of urine
- D. Secretion

32. Aggregates of lymphoid nodules located in the wall of the ileum of the small intestines are -----

- A. Werner's nodes
- B. Submucosal tonsils
- C. Peyer's patches
- D. Appendices

33. Collection of lymphoid tissue (MALT) that guard mucosal surfaces include all the following **EXCEPT**-----

- A. Thymus
- B. Peyer's patches
- C. Tonsils
- D. Appendix

34. In addition to its lymphoid function, this organ holds a reservoir of platelets.

- A. Tonsil
- B. Spleen
- C. Thymus
- D. Cisterna chyle

35. The neutrophil count is often increased in a patient with -----

- A. Anemia
- B. Low blood glucose
- C. HIV/AIDS
- D. Asthma

Match each of the following types of white blood cells (WBC) with their correct function e.g. 32. A. NB: There is only ONE answer for each question.

White blood cell (WBC)	Function
36. Neutrophils	A. Release histamine
37. Lymphocytes	B. Phagocytise bacteria
38. Monocytes	C. Kill parasitic worms
39. Eosinophils	D. Mount immune response by direct cell attack
40. Basophils	E. Develop into macrophages and phagocytise bacteria

Total: 40 Marks

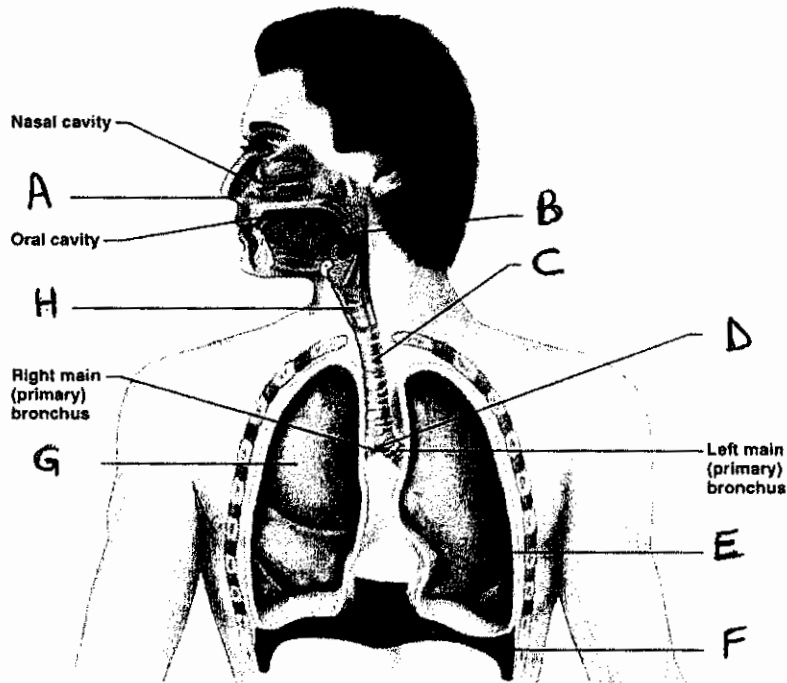
SECTION 2

Instructions: In this section, Question 1 is compulsory. Then answer any other two (2) questions in this section.

Question 1

A. Differentiate between tuberculosis and asthma in terms of their definitions. (2)

B. Study the diagram below and label the necessary structures of the respiratory system (A-H) (8)



C. State one (1) function of each of the above structures in B (A-H) (8)

D. List any two (2) symptoms of a person with tuberculosis (TB) infection. (2)

Total: 20 Marks

Question 2

- A. State and describe any three (3) conditions that may alter the normal skin color (6)
- B. The environment we are living in is teemed with bacteria; a lot of bacteria are found in the pools we swim in, the water we wash with, and on the hands we eat with. Explain how does the skin protect us chemically from being flooded with bacterial infections? (4)
- C. As a teenager, you experience pimples/acne and blackheads, which frequently become infected. Explain the physiology of the cause of these problems? (3)
- D. Draw the structure of the skin and label the following: (7)
- i. Epidermis
 - ii. Dermis
 - iii. Hair follicle
 - iv. Blood vessels
 - v. Sweat gland
 - vi. Adipose tissue
 - vii. Hypodermis

Total: 20 Marks

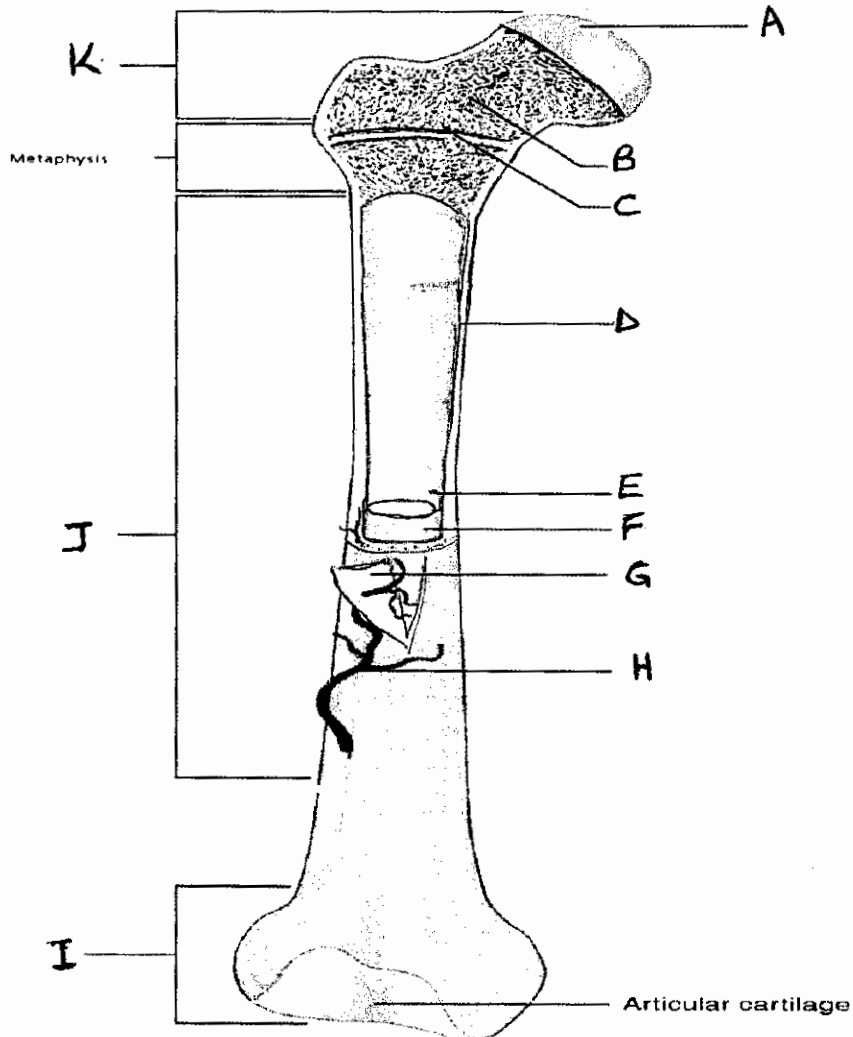
Question 3

1. You have learnt that diabetes mellitus is due to lack of a hormone.
- A. Which hormone causes this condition? (1)
- B. Describe how the above hormone lowers the blood glucose level in the body (3)
- C. Describe the three (3) symptoms/cardinal signs that are common in diabetes mellitus (6)
- D. State the events that take place when a short term stressor activates the body to a fight-or-flight response. (10)

Total: 20 Marks

Question 4

- A. Define an osteoblast (1)
- B. Describe any four (4) functions of a bone and give examples in each. (8)
- C. Study the diagram below and label the necessary structures of the long bone from A – K. (11)



Total: 20 marks