



UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION
MARCH 2025 SEMESTER

COURSE CODE : HGB10103
COURSE TITLE : HUMAN ANATOMY & PHYSIOLOGY
PROGRAMME NAME : BACHELOR OF ENVIRONMENTAL HEALTH (HONS)
DATE : 02 JULY 2025
TIME : 9:00AM - 12:00PM
DURATION : 3 HOURS



INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. *Tick if applicable*
9. Refer to the attached Formula/ Appendies. *Tick if applicable*

THERE ARE 17 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

1. In contrast to the right ventricle, the left ventricle _____.
 - A. has a thicker wall
 - B. has a thinner wall
 - C. increases in diameter during contraction
 - D. develops less pressure during contraction

2. Which of the following statements is true about astrocytes?
 - A. Astrocytes are the smallest and the rarest of neuroglia in the central nervous system.
 - B. Astrocytes secrete chemicals that cause the capillaries of the central nervous system become impermeable to many compounds.
 - C. Astrocytes produce cerebrospinal fluid and help circulate the fluid within and around the central nervous system.
 - D. Astrocytes wrap around axons, creating myelin sheath

3. In males, meiosis produces _____ spermatids.
 - A. four diploid
 - B. two haploid
 - C. four haploid
 - D. two diploid

4. Which of the following occurs during inhalation?
- A. The diaphragm contracts and moves downward.
 - B. Air pressure inside the lungs becomes greater than atmospheric pressure.
 - C. The rib cage moves inward and downward.
 - D. The lungs deflate.
5. Which event triggers the power stroke in muscle contraction?
- A. The release of ADP
 - B. The release of ATP
 - C. The release of calcium ions
 - D. The release of inorganic phosphate
6. The higher the plasma concentrations of aldosterone, the more efficiently the kidney will _____.
- A. stimulate urinary water loss
 - B. excrete sodium ions
 - C. conserve sodium ions
 - D. retain potassium ions
7. Which of the following is the functional unit of the nervous system?
- A. Neuron
 - B. Dendrite
 - C. Synapse
 - D. Axon

8. Which of the following would happen if the chordae tendineae is damaged?
- A. The semilunar valves would stay open throughout the cardiac cycle.
 - B. Blood would flow into the ventricles during atrial systole.
 - C. Blood would backflow into the atrium during ventricular systole.
 - D. The atrioventricular valves would close properly during ventricular systole.
9. Which structure allows for communication between osteocytes in an osteon?
- A. Trabeculae
 - B. Lacunae
 - C. Haversian canal
 - D. Canaliculi
10. The Haversian (central) canal in each osteon contains _____.
- A. osteoblasts
 - B. synovial fluid
 - C. blood vessels
 - D. hydroxyapatite
11. A muscle fascicle is a _____.
- A. bundle of myofibrils
 - B. bundle of muscle fibers
 - C. single muscle cell
 - D. bundle of connective tissue

12. What happens when the membranes become depolarized during the generation of an electrical impulse in neurons?
- A. Chloride ions enter the cell, making the interior more negative.
 - B. The membrane potential remains unchanged.
 - C. Potassium ions move out of the cell, making the interior more negative.
 - D. Sodium ions move into the cell, making the interior less negative.
13. Which structure is the primary site for gas exchange in the lungs?
- A. Bronchioles
 - B. Trachea
 - C. Alveoli
 - D. Bronchi
14. Which organ is part of the lymphatic system and plays a key role in filtering blood and recycling old red blood cells?
- A. Spleen
 - B. Liver
 - C. Bone marrow
 - D. Thymus
15. Which organ is responsible for the production of bile?
- A. Liver
 - B. Gallbladder
 - C. Pancreas
 - D. Stomach

16. Which part of the digestive system is responsible for water absorption?
- A. Pancreas
 - B. Small intestine
 - C. Stomach
 - D. Large intestine
17. Which of the following hormones regulates water reabsorption in the kidneys?
- A. Insulin
 - B. Thyroxine
 - C. Antidiuretic hormone (ADH)
 - D. Estrogen
18. Which process occurs in the glomerulus of the nephron?
- A. Storage of urine
 - B. Filtration of blood plasma
 - C. Secretion of potassium ions
 - D. Reabsorption of nutrients
19. What is the role of red blood cells in the cardiovascular system?
- A. Fighting infections.
 - B. Transporting oxygen to tissues and removing carbon dioxide.
 - C. Clotting blood.
 - D. Regulating blood pressure.

20. Which of the following is correct about the endocrine system?
- A. It involves glands that use ducts to transport their secretions.
 - B. It helps to maintain homeostasis.
 - C. It stimulates the contraction of the skeletal muscles to produce movement.
 - D. It is a communication system in the body that uses electrical impulses.
21. _____ cells secrete surfactant that reduces the tendency for pulmonary alveoli to collapse.
- A. Macrophage
 - B. Fibroblast
 - C. Type II alveolar or Septal
 - D. Type I alveolar
22. The intrinsic factor is produced by _____ cells of the gastric glands.
- A. goblet
 - B. chief
 - C. G
 - D. parietal
23. What is the primary function of the respiratory system?
- A. Regulating body temperature.
 - B. Supplying oxygen to the blood and removing carbon dioxide.
 - C. Transporting nutrients to cells.
 - D. Producing hormones for digestion.

24. Which of the following best describes lymph?
- A. A protein-rich fluid produced by the liver
 - B. A fluid secreted by the pancreas for digestion
 - C. A fluid containing red blood cells and oxygen
 - D. A clear fluid that circulates in the lymphatic vessels, containing white blood cells
25. Which type of immunity is acquired after exposure to a pathogen or vaccination?
- A. Non-specific immunity
 - B. Passive immunity
 - C. Innate immunity
 - D. Adaptive immunity
26. Which of the following lymphatic organs destroys defective blood cells?
- A. Lymphatic nodes
 - B. Thymus
 - C. Spleen
 - D. Lymphatic nodules
27. What role does the thymus play in the lymphatic system?
- A. It filters lymph to remove toxins.
 - B. It is the site of T-cell maturation and development.
 - C. It absorbs fats from the digestive tract.
 - D. It produces hormones that regulate heart rate.

28. Which of the following is the correct arrangement of the skin epithelium from the deepest layer to the most superficial layer?
- A. Stratum lucidum, stratum corneum, stratum granulosum, and stratum germinativum.
 - B. Stratum corneum, stratum lucidum, stratum granulosum, and stratum germinativum.
 - C. Stratum germinativum, stratum spinosum, stratum granulosum, stratum lucidum, and stratum corneum.
 - D. Stratum basale, stratum corneum, keratohyaline, and keratinocytes.
29. Which of the following is an organ of the male reproductive system?
- A. Fallopian tube
 - B. Epididymis
 - C. Ureter
 - D. Epidermis
30. Which structure in the male reproductive system transports sperm from the testes to the urethra?
- A. Seminal vesicle
 - B. Vas deferens
 - C. Prostate gland
 - D. Epididymis
31. The enzyme pepsin is produced by _____.
- A. liver and breaks down lipid
 - B. stomach and breaks down protein
 - C. duodenum and breaks down carbohydrate
 - D. pancreas and breaks down protein

32. Which of the following parts of the nephron absorb water through endocrine regulation?
- A. Glomerulus
 - B. Collecting tubule
 - C. Descending limb of nephron loop
 - D. Ascending limb of nephron loop
33. What is the primary function of the small intestine in digestion?
- A. Breaking down proteins into amino acids.
 - B. Absorbing nutrients into the bloodstream.
 - C. Storing and concentrating bile.
 - D. Removing waste products from the body.
34. Which cells are primarily responsible for the adaptive immune response by recognizing and responding to specific antigens?
- A. B lymphocytes and T lymphocytes
 - B. Red blood cells
 - C. Platelets
 - D. Neutrophils and macrophages
35. Which of the following is a characteristic of the innate immune system?
- A. It relies on B cells and T cells for its response.
 - B. It develops memory for specific antigens after exposure.
 - C. It provides a non-specific defense against pathogens.
 - D. It requires prior exposure to pathogens to function effectively.

36. What structure prevents the backflow of blood from the left ventricle into the left atrium?
- A. Tricuspid valve
 - B. Pulmonary valve
 - C. Mitral valve
 - D. Aortic valve
37. Which gland is often referred to as the "master gland" because it regulates the activity of many other endocrine glands?
- A. Thyroid gland
 - B. Adrenal gland
 - C. Pineal gland
 - D. Pituitary gland
38. What hormone is produced by the adrenal medulla in response to stress and prepares the body for "fight or flight"?
- A. Thyroxine
 - B. Aldosterone
 - C. Adrenaline
 - D. Cortisol
39. Which of the following hormones is responsible for regulating the body's metabolic rate?
- A. Thyroxine (T4)
 - B. Oxytocin
 - C. Parathyroid hormone
 - D. Antidiuretic hormone (ADH)

40. What is the role of antibodies in the immune response?
- A. To produce white blood cells.
 - B. To destroy infected cells directly.
 - C. To increase the production of lymph.
 - D. To bind to antigens and neutralize or mark them for destruction.

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Understanding the human body's structure and function is essential in anatomy and physiology. This includes knowledge of anatomical position, body planes, directional terms, and the role of feedback mechanisms in maintaining homeostasis.

- (a) Describe the standard human anatomical position.

(2 marks)

- (b) Identify the body planes shown below:

Refer Below - Figure1 : Body planes .

(3 marks)

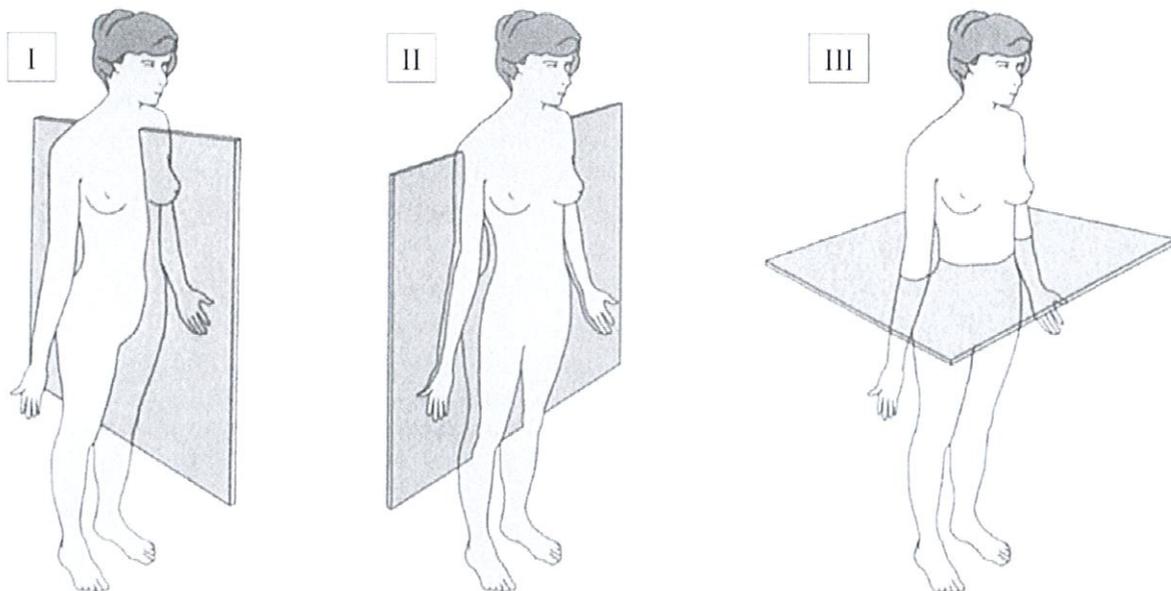


Figure 1: Body planes

- (c) Apply the correct terminology for the blank space:
In the anatomical position, the face and palms are on the __ (I) __ body surface; the buttocks and shoulder blades are on the __ (II) __ body surface; and the top of the head is the most __ (III) __ part of the body. The ears are __ (IV) __ to the shoulders. The elbow is __ (V) __ to the fingers
(5 marks)
- (d) Describe the concept of homeostasis.
(2 marks)
- (e) Discuss the roles of negative and positive feedback mechanisms in the homeostatic regulation of human physiology by providing a specific example of each mechanism.
(8 marks)

Question 2

- (a) Identify the layers of the epidermis shown in the figure below:
Refer Below - Figure2 : Epidermis .

(4 marks)

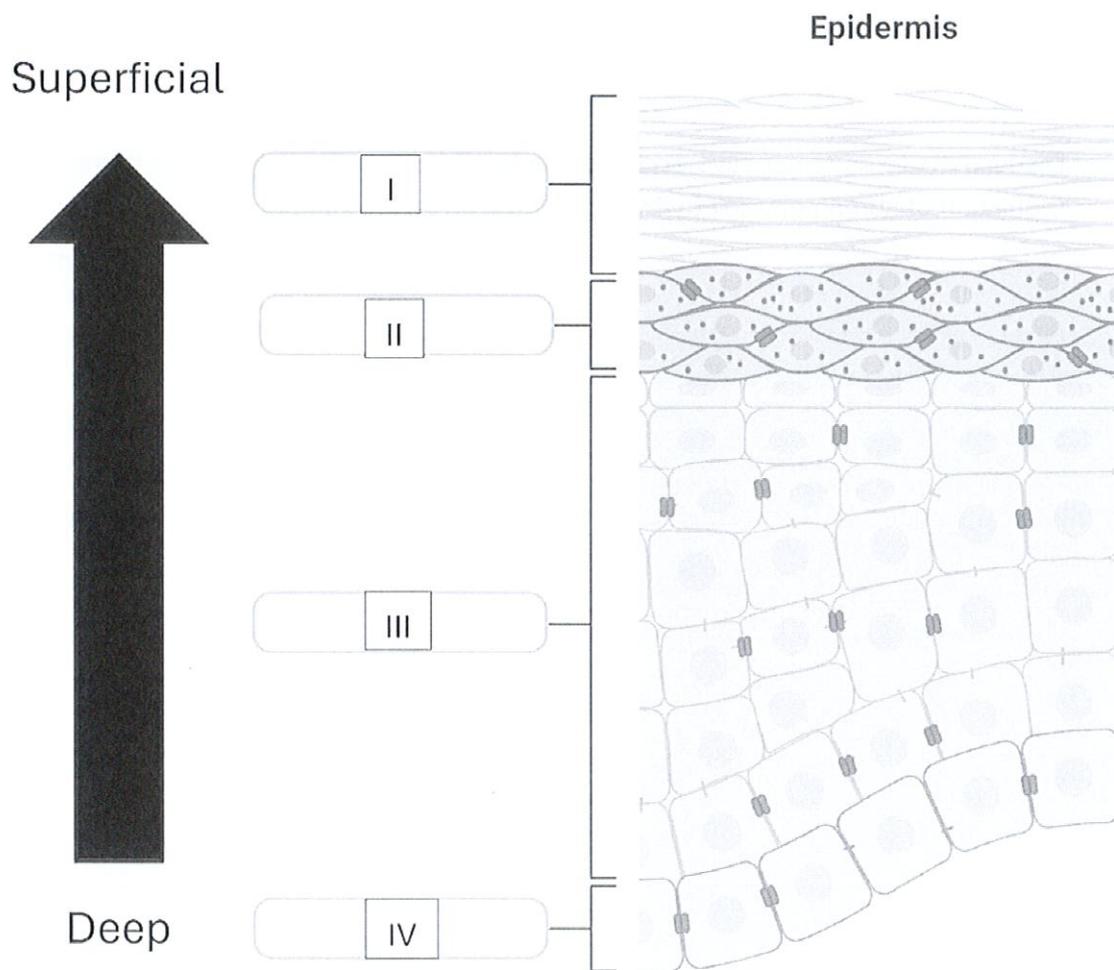


Figure 2: Epidermis

- (b) Identify the additional epidermal layer that is found in the palm of the hand.

(1 marks)

(c) Explain how the integumentary system contributes to skin color. (5 marks)

(d) Discuss how the epidermis contributes to the following functions in the human body:
I) Providing protection
II) Storing nutrients
III) Producing vitamins (10 marks)

Question 3

(a) Illustrate and label the structure of a sarcomere within a myofibril of skeletal muscle. (5 marks)

(b) Describe the functions of the muscular system in the physiology of the human body. (5 marks)

(c) Discuss the molecular mechanisms of muscle contraction by explaining the sliding filament theory. (10 marks)

Question 4

- (a) Explain the difference between endocrine glands and exocrine glands.
(5 marks)
- (b) Examine the role of the hypophyseal portal system in regulating the release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) by the anterior pituitary gland.
(5 marks)
- (c) Examine the interactions between the thyroid gland, the parathyroid glands and the kidneys in the regulation of blood calcium level.
(10 marks)

END OF EXAMINATION PAPER

