



University of Fort Hare
Together in Excellence

Programme Unit: Nursing Sciences
East London Campus

SEMESTER EXAMINATION: JUNE 2023

Human Physiology 1A

COURSE CODE: HPS 111E
TOTAL MARKS: 100
TIME: 3 HOURS

THIS QUESTION PAPER CONSISTS OF 10 PAGES INCLUDING THIS PAGE

INTERNAL EXAMINERS:	Student number.....
DR N Sekoba	Surname.....
DR P Chitnis	Full names.....

Instructions to students:

This question paper consists of four sections (A, B, C, D) and all questions are compulsory.

Answer Section A, Section B and Section C on the question paper and Section D on the answer book.

Submit question paper along with answer book.

Please write clearly and legibly

SECTION A

(25 marks)

Choose & circle the most correct option:

1. Krebs cycle leads to a net gain of:
 - a. 4 ATP
 - b. 26 ATP
 - c. 2 ATP
 - d. 32 ATP

2. The end-product of Glycolysis is:
 - a. Two molecules of Pyruvic acid
 - b. Two molecules of dihydroxy acetone phosphate
 - c. Two molecules of Glyceraldehyde
 - d. Two molecules of Fructose 1,6-biphosphate

3. Krebs cycle:
 - a. Anaerobic process
 - b. Aerobic process
 - c. A metabolic process which gets inhibited if oxygen is present
 - d. Doesn't use oxygen, whether or not oxygen is present

4. During chemiosmosis, the only areas of the inner mitochondrial membrane which are permeable to proton of hydrogen atom (H^+) are:
 - a. Complexes III & IV
 - b. Complexes I & II
 - c. Only complexes IV
 - d. Complexes V

5. Which of the following is not true for Beta oxidation.
 - a. Beta oxidation occurs in the cytosol
 - b. Converts fatty acids to acetyl CoA
 - c. ATP is needed to convert Fatty acids to acetyl CoA
 - d. During beta oxidation enzymes snips off two-acetic acid fragments

6. Which of the following is true for keto acid modification.
 - a. The keto acids from transamination are altered so that they can enter the glycolysis pathway
 - b. Keto acid modification occurs during protein synthesis
 - c. Modified keto acids into pyruvic acid can be reconverted to glucose and contribute to gluconeogenesis
 - d. Keto acids are modified into glyceraldehyde-3-phosphate

7. Which of the following is true for gluconeogenesis?
- It is the process of forming new glucose from carbohydrate molecules
 - Gluconeogenesis protects the nervous system from damages of hyperglycemia.
 - When high ATP levels turn off glycolysis, glucose molecules are combined to form glycogen.
 - It takes place when dietary sources and glucose reserves are used up and blood glucose levels are low.
8. An adult is said to have hypotension when the systolic blood pressure is less than:
- 70 mm Hg
 - 100 mm Hg
 - 50 mm Hg
 - 80 mm Hg
9. The Cardiac output is regulated by:
- Preload and afterload
 - Stroke volume
 - Heart rate
 - All of the above
10. Which of the following is not true for baroreceptor reflexes when maintaining blood pressure homeostasis:
- Decreased blood pressure, decreases impulses from baroreceptors
 - Decreased blood pressure, decreases activate cardioacceleratory center
 - Decreased blood pressure, decreases sympathetic impulses
 - Decreased blood pressure, increases cardiac output
11. An individual with Rh positive blood has:
- No antigen on his red blood cells
 - Anti-D & Anti-C antibodies on his red blood cells
 - D antigen on his red blood cell
 - Only anti-D antibodies on his red blood cells
12. In the process of coagulation, which of the following converts Fibrinogen into Fibrin?
- Prothrombin activator
 - Factor X
 - Prothrombin
 - Thrombin
13. Which of the following is not true for Extrinsic pathway of coagulation?
- It is fast
 - In severe trauma, it can form clot in 15 seconds
 - It can initiate clotting in a test tube
 - The tissue factor it requires is outside of blood

14. The normal life span of red blood cells is:
- 10 - 20 days
 - 50 - 70 days
 - 90 - 120 days
 - 30 - 40 days
15. Which of the following infections are increased in allergic reactions and parasitic infections?
- Neutrophils
 - Eosinophils
 - Lymphocytes
 - Basophils
16. There are five major leukocytes. Which of the following is the most numerous white blood cell?
- Basophils
 - Eosinophils
 - Monocytes
 - Neutrophil
17. Which of the following is the principle lymphoid organ in the body?
- Spleen
 - Tonsils
 - Lymph nodes
 - Peyer's patches in intestine
18. Which of the following organs is involved in achieving immunocompetence for T lymphocytes?
- Tonsils
 - Thymus
 - Spleen
 - Lymph nodes
19. Which lymphatic structure does not drain lymph from the right upper limb and the right side of the head and thorax?
- Lumbar trunk
 - Thoracic duct
 - Right lymphatic duct
 - Cisterna chyli
20. Internal respiration involves:
- Movement of oxygen from the lungs to the blood
 - Movement of oxygen from blood to the lungs
 - Movement of oxygen from tissue cells to blood
 - Movement of oxygen from blood to tissue cells

21. Which of the following factors determine the direction of the gas movement?
- Temperature
 - Moisture
 - Volume
 - Pressure gradient
22. The presence of proteins or blood cells in the urine usually indicates problem with the:
- Loop of Henle
 - Collecting ducts
 - Vasa recta
 - Filtration membrane
23. Carbohydrates are acted on in the GIT by:
- Peptidases, trypsin & chymotrypsin
 - Amylase, maltase & sucrase
 - Peptidases, lipases, galactases
 - Lipases
24. The products of protein digestion enter the blood stream largely through the cells lining the:
- Stomach
 - Large intestine
 - Bile duct
 - Small intestine
25. Which of the following is not the function of saliva?
- Begins digestion of carbohydrates
 - Facilitates absorption of glucose- across the oral mucosa
 - Facilitates speech
 - Plays an important role in oral hygiene.

Section B

(25 Marks)

Circle the correct option: True or False

1. True or False. Golgi apparatus is responsible for packaging, modifying and segregating proteins for secretion from the cell.
2. True or False. Nucleus is the control center that serves as the ATP synthesis site.
3. True or False. Peripheral proteins support the cell membrane from its cytoplasmic side.
4. True or False. Microtubules support the cell and give it shape.
5. True or False. Desmosomes are communicating junctions between the adjacent cells which are connected by connexons.
6. True or False. The G2/M checkpoint ensures that all DNA is replicated and damaged DNA has been repaired.
7. True or False. During protein catabolism, amino acid is converted to keto acid which enters the Krebs cycle.
8. True or False. Liver glycogen is an important source of energy for skeletal muscles when they have depleted their own glycogen reserves.
9. True or False. Glucose-6-phosphatase is an enzyme that converts glucose-6-phosphate to glucose in skeletal muscle.
10. True or False. The short-term mechanisms of blood pressure regulation are mediated by the nervous system & endocrine system.
11. True or False. When afterload increases cardiac output increases.
12. True or False. Angiotensin II stimulates adrenal cortex to secrete aldosterone in order to increase blood volume & blood pressure.
13. True or False. When venous return increases heart rate also increases.
14. True or False. When red blood cells are destroyed, heme is degraded to bilirubin which is conjugated by liver.
15. True or False. Aplastic anemia may result due to destruction or inhibition of red marrow by ionizing radiation.
16. True or False. Erythrocytes, leukocytes, and platelets all originate from the same undifferentiated stem cells.
17. True or False. Iron is essential for hemoglobin synthesis.
18. True or False. Lymphocytes are increased in large quantities in chronic infections in the body.

19. True or False. Platelets are considered complete cells.
20. True or False. White blood cells spend the majority of their time in the blood.
21. True or False. Swollen lymph nodes usually occur because of infection from bacteria or viruses.
22. True or False. The proximal convoluted tubule is the major site of Tubular secretion.
23. True or False. Vasa recta act is a countercurrent exchanger to maintain osmolality of plasma at 300 mOsm.
24. True or False. Acid cannot normally penetrate into or between the cells lining the stomach, which enables the stomach to contain acid without injuring itself.
25. True or False. Hydrochloric acid (HCl) is secreted by parietal cells.

Section C:

(10 Marks)

Fill in the correct answer:

1. The _____ are the major lipid components of the cell membrane. [1]
2. The barrier that separates and controls movement between the cell contents and the extracellular fluid is _____. [1]
3. _____ are small connecting tunnels formed by connexons between the cardiac muscle cells. The connections are a good example of an electrical synapse. [1]
4. Erythropoietin is a chemical that is involved in starting the process of erythropoiesis. Erythropoietin is a _____ produced by the _____. [2]
5. In blood, iron is transported loosely bound to a transport protein called _____. [1]
6. Lymph flows through successively larger and thicker-walled channels. Complete the following: [2]

Lymphatic capillaries

↓

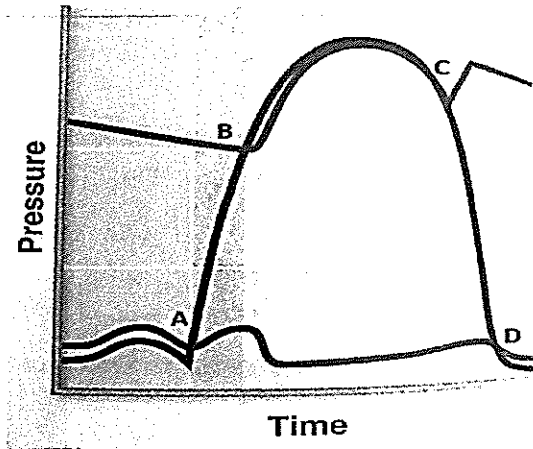
↓

Lymphatic trunk

↓
7. _____ is the phenomenon of the lungs snapping back to their resting size after having been stretched. [1]
8. _____ is the erythrocytic enzyme that catalyzes the conversion of CO_2 into HCO_3^- . [1]

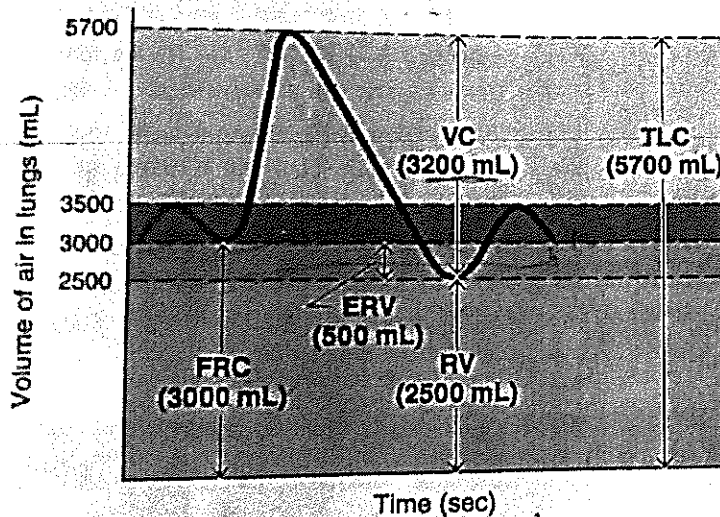
Section D: write this section on an answer book provided (40 Marks)

1. Answer the following questions in relation the cardiac cycle diagram depicted below: [10 marks]



- I. Name the type of valves that are open at D? [1]
- II. By the end of segment AB, what will the ventricular volume amount to, known as the end of diastolic volume? [1]
- III. If end systolic volume is 50ml/beat, with the answer from II, calculate the stroke volume (showing formula and steps of calculation) [3]
- IV. The second heart sound is depicted by which letter in the diagram? [1]
- V. Name two periods during which all four valves are closed and the volumes in the chambers are constant? [2]
- VI. Segment BC represents ventricular diastole/systole, circle the correct answer? [1]
- VII. At segment C, blood in the aorta against the closed valve, causes the pressure to rise an event known as? [1]

2. Answer the following questions in relation to the diagram below: [10 marks]



(a) Spirogram in obstructive lung disease

- I. What is the function of a spirogram? [2]
 - II. What is an obstructive lung disease and give one example of an obstructive lung disease? [2]
 - III. From the diagram, name two respiratory capacities/volumes that has increased and two respiratory capacities/volumes that has decreased in an individual with obstructive lung disease compared to capacities/volumes of a healthy male? [4]
 - IV. What does a forced expiratory volume in 1 second (FEV_1) measure and what is the amount of FEV_1 in percentage, that a person with obstructive lung disease can exhale? [2]
3. Draw a flow diagram describing the intrinsic mechanism that regulates Glomerular filtration rate (GFR) when systematic blood pressure has decreased. [10]
 4. Name five digestive processes and explain each digestive process in relation to the mouth. [10]

.....END.....

****GOOD LUCK****