



University of Fort Hare
Together in Excellence

Programme Unit: Nursing Sciences
East London Campus

SUPPLEMENTARY EXAMINATION: JULY 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. Glycolysis leads to a net gain of:
 - a. 3 NADH + H⁺
 - b. 2 NADH + H⁺
 - c. 6 NADH + H⁺, 2 FADH₂
 - d. 3 NADH + H⁺, 1 FADH₂

2. When Pyruvic acid enters into Krebs cycle, it is first converted into:
 - a. Citric acid
 - b. Succinic acid
 - c. Fumaric acid
 - d. Coenzyme A

3. Which of the following is not true for Krebs cycle?
 - a. The breakdown products of carbohydrates, fat and proteins can feed into Krebs cycle.
 - b. The Krebs cycle is a source of building materials for anabolic reactions in the body.
 - c. Krebs cycle is exclusive to carbohydrate metabolism.
 - d. During each cycle of Krebs cycle, 1 molecule of ATP is formed.

4. Which of the following is true for lipogenesis.
 - a. Lipogenesis occurs when ATP and glucose levels are low.
 - b. Acetyl CoA, an intermediate in glucose catabolism, is not involved in lipogenesis.
 - c. Lipogenesis is a catabolic process.
 - d. Excess amounts of carbohydrates and amino acids are converted to triglycerides.

5. Which of the following is not true for protein metabolism.
 - a. Amino acids are the most important anabolic nutrients
 - b. Excess protein can be stored in the body
 - c. Amino acids undergo deamination before they are oxidized for energy
 - d. Amino acids can be converted to fat for future energy usage

6. Which of the following is not true for oxidative phosphorylation.
 - a. Oxidative phosphorylation has two phases which is the electron transport chain and chemiosmosis
 - b. The hydrogens removed during the oxidation of food fuels are combined with oxygen to form water
 - c. Reduced coenzyme NADH + H⁺ delivers electrons to complex II
 - d. Complex V is also known as the ATP synthase

7. An adult is said to have high blood pressure when the blood pressure is more than:
- 130/80 mmHg
 - 130/85 mm Hg
 - 140/90 mm Hg
 - 120/85 mm Hg
8. Which of the following substance is produced by activated factor X during coagulation?
- Proconvertin
 - Proaccelerin
 - Prothrombin
 - Prothrombin activator
9. In ABO blood group system, person with blood group:
- A has A antibodies & no antigen.
 - B has B antibodies & no antigen.
 - O has A & B antibodies.
 - AB has A antibodies & B antigen.
10. The pH of blood is:
- 8.50 - 9
 - 9.25 - 10.25
 - 10.35 - 11.35
 - 7.35 - 7.45
11. Which of the following is not true for a condition known as the hemolytic disease of the newborn or erythroblastosis fetalis?
- All Rh-positive babies born to Rh-negative mother develop hyperbilirubinemia leading to jaundice
 - The first Rh-positive baby born to Rh-negative mother always escapes jaundice
 - When a baby experiences this condition, they become anemic and in severe cases they experience brain damage
 - Anti-D immunoglobulin given to Rh-negative mother within 24 -72 hours after first delivery prevents Erythroblastosis fetalis
12. There are five major leukocytes. Which of the following is the rarest of the five when a person is not sick?
- Basophils
 - Eosinophils
 - Monocytes
 - Lymphatic system

13. Histamine is a chemical that causes blood vessels to dilate in an effort to increase the flow of blood and subsequently leukocytes to the infected site. Which of the following leukocytes release the most histamine?
- Basophils
 - Eosinophils
 - T Lymphocytes
 - Neutrophils
14. Hemopoiesis is _____, homeostasis is _____, and hemostasis is _____.
- Blood formation, a process of maintaining a steady state, blood clotting
 - A process of maintaining a steady state, blood formation, blood clotting
 - Blood clotting, blood formation, a process of maintain a steady state
 - Blood clotting, maintaining steady state, blood formation
15. Which of the following is the secondary lymphoid organ in the body?
- Thymus
 - Red bone marrow
 - Spleen
 - Kidney
16. Lymph is equivalent in its composition to:
- Urine filtrate
 - Sweat
 - Blood
 - Interstitial fluid
17. B cells mature in the:
- Thymus
 - Tonsils
 - Red bone marrow
 - Kidney
18. The major portion of Carbon dioxide transported by blood from the tissue cells to blood is:
- Hydrochloric acid
 - Hydrogen ion in plasma
 - Carbonic acid
 - Bicarbonate ion in plasma
19. What is the normal respiratory rate in adults?
- 30 - 40/minute
 - 12 - 14/minute
 - 50 - 60/minute
 - 20 - 30/minute

20. Which of the following substances are neither reabsorbed nor secreted by the kidney?
- Glucose
 - Amino acids
 - Urea
 - Creatinine
21. What is normal glomerular filtration rate?
- 2 - 3 ml/minute
 - 10 - 12 ml/minute
 - 120 - 125 ml/minute
 - 50 - 70 ml/minute
22. Which hormone is involved in the formation of concentrated urine by the kidneys?
- Glucocorticoids
 - Thyroxine
 - Renin
 - Antidiuretic hormone
23. What is the net filtration pressure at glomerulus?
- 100 mm Hg
 - 55 mm Hg
 - 10 mm Hg
 - 50 mm Hg
24. The pH of urine is:
- Slightly alkaline
 - Slightly acidic
 - Strongly acidic
 - Strongly alkaline
25. Which of the following is the major digestive organ?
- Stomach
 - Small intestine
 - Liver
 - Large intestine

Section B (20 marks)

Circle the correct option: True or False

1. True or False. Lysosomes detoxify free radicals produced in the body with the help of enzymes.
2. True or False. The largest cells in the human body can be seen by the unaided eyes.
3. True or False. Integral proteins span the entire width of the cell membrane & are mainly involved in transport.
4. True or False. Microfilaments are involved in cell motility and resist mechanical forces acting on the cell.
5. True or False. DNA is synthesized during the G₁ subphase of the interphase.
6. True or False. During electron transport chain, energy generated is used to push protons from matrix to intermembrane space.
7. True or False. When carbohydrates are deficient, oxaloacetic acid is converted into glucose to provide energy to the brain.
8. True or False. During Gluconeogenesis, new glucose is formed in the body from breakdown of glycogen.
9. True or False. Hexokinase present in only the liver converts glucose to glucose-6-phosphate.
10. True or False. When preload increases cardiac output increases.
11. True or False. Leukemia is a cancerous condition involving white blood cells where there is overproduction of abnormal leukocytes.
12. True or False. In acute infections like tonsillitis, neutrophils are increased as a defense mechanism of the body.
13. True or False. Pernicious anemia is an autoimmune disease that most affects the elderly and results from lack of intrinsic factor.
14. True or False. Platelets are cell fragments.
15. True or False. A platelet count of under 100,000/ul is diagnostic of Thrombocytopenia.
16. True or False. The lymph nodes are firm on palpation when they are enlarged due to the spread of cancer to them.
17. True or False. The lymphatic system is part of the immune system.

18. True or False. When Macula densa cells are exposed to low concentration of NaCl, they cause vasodilation by releasing vasoactive amine.
19. True or False. The descending limb of loop of Henle is permeable to solutes.
20. True or False. During inspiration, intrathoracic volume increases as diaphragm and external intercostal muscles are activated.

Section C

(15 Marks)

Fill in the correct answer:

1. Write the identifying letters in the blank space provided, in proper order, indicating the proper sequence by which filtered fluid flows as it transverses the structures in question.
 - a. Collecting tubule
 - b. Bowman's capsule
 - c. Proximal tubule
 - d. Loop of Henle
 - e. Distal tubule
 - f. Glomerulus

Write Answer here: _____ [6]

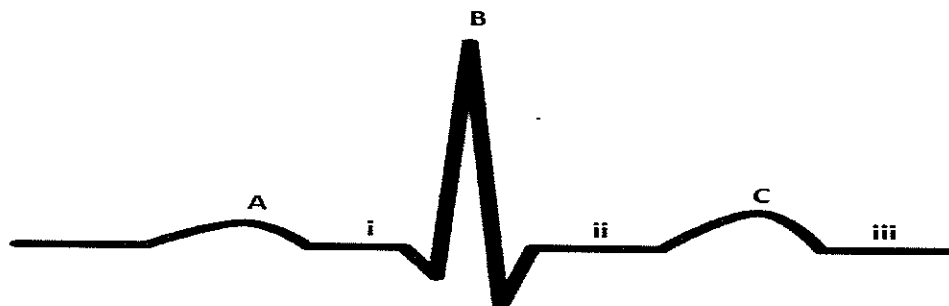
2. Match the following blood abnormalities with their causes. [8]

<input type="checkbox"/>	I. Deficiency of intrinsic factor	a. Hemolytic anemia
<input type="checkbox"/>	II. Insufficient amount of iron to synthesize adequate Hemoglobin	b. aplastic anemia
<input type="checkbox"/>	III. Destruction of bone marrow	c. nutritional anemia
<input type="checkbox"/>	IV. Abnormal loss of blood	d. hemorrhagic anemia
<input type="checkbox"/>	V. Tumorlike condition of bone marrow	e. pernicious anemia
<input type="checkbox"/>	VI. Inadequate erythropoietin secretion	f. Renal anemia
<input type="checkbox"/>	VII. Excessive rupture of circulating erythrocytes	g. Primary polycythemia
<input type="checkbox"/>	VIII. Associated with living at high altitude	h. Secondary polycythemia

3. _____ is the measure of the magnitude of change in lung volume accomplished by a given change in the transmural pressure gradient. [1]

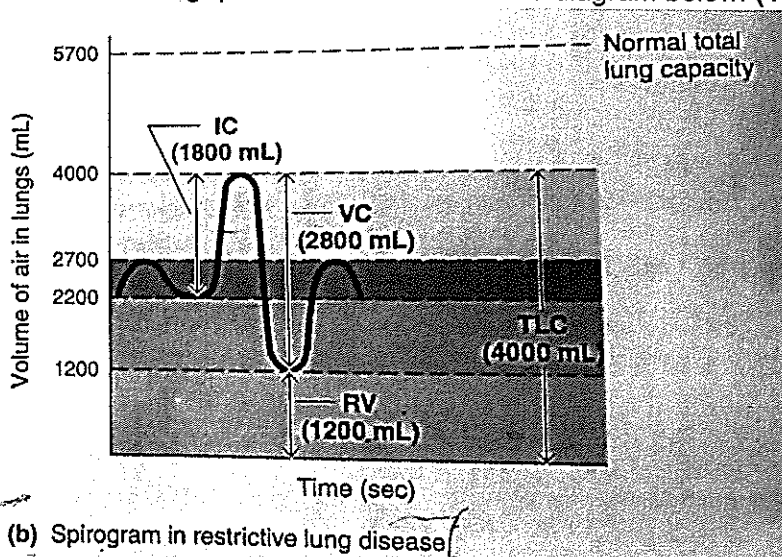
Section D: write this section on an answer book provided (40 Marks)

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



- I. Label A, B, C and name their electrical activity. [6]
- II. Label each segment (i, iii) and explain what happens during each segment? [4]

2. Answer the following questions in relation to the diagram below: (10 marks)



(b) Spirogram in restrictive lung disease

- I. What is the function of a pulmonary function test? [2]
- II. What is a restrictive lung disease and give one example of a restrictive lung disease? [2]
- III. From the diagram, name four respiratory capacities/volume that has decreased in an individual with restrictive lung disease compared to respiratory capacities/volume of a healthy male? [4]
- IV. What does a forced expiratory volume (FEV) measure and what is the amount of FEV₁ in percentage, that a person with restrictive lung disease can exhale? [2]