



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF NURSING AND MIDWIFERY SCIENCES
BACHELOR OF SCIENCE IN NURSING (BSN)
SEPTEMBER-DECEMBER 2024 TRIMESTER MAIN EXAMINATION**

COURSE CODE AND TITLE: BSN 213- Medical Biochemistry

DATE: THURSDAY 4TH DECEMBER 2024

TIME: 2 HOURS

START: 9:00AM

END: 11:00AM

Instructions

- 1) This exam is out of 70
- 2) This paper has three sections: Section I: Multiple choice Questions (MCQ) (20 marks), Section II: Short answer questions (SAQ) (30 marks) and Section III: Long answer question (LAQ) (20marks)
- 3) Answer **ALL** questions in Section I and Section II and III
- 4) Answer all the questions in the examination booklets provided
- 5) Any rough work to be done at the back of the answer booklet

SECTION I: MULTIPLE CHOICE QUESTIONS (MCQs)

(20 MARKS):

1. Coenzymes _____.
 - A. are types of apoenzymes
 - B. are proteins
 - C. are inorganic cofactors
 - D. are organic cofactors
2. Activation energy _____.
 - A. is the amount of energy required during an organism activity
 - B. requires the addition of nutrients in the presence of water
 - C. is lowered by the action of organic catalysts
 - D. results from the movement of molecules
3. Muscle tissue primarily relies on which substrate during prolonged, moderate-intensity exercise?
 - A. Glucose
 - B. Fatty acids
 - C. Amino acids
 - D. Lactate
4. The following does not affect the function of enzymes: -
 - A. Ubiquinone
 - B. Substrate concentration
 - C. Temperature
 - D. Competitive inhibitors
5. What is the major carrier of nitrogen in the bloodstream?
 - A. Ammonia
 - B. Urea
 - C. Glutamine
 - D. Alanine
6. The phase of the HMP shunt that is primarily responsible for generating NADPH is: -
 - A. Oxidative phase
 - B. Non-oxidative phase
 - C. Glycolytic phase
 - D. CA cycle phase
7. A major difference between anaerobic respiration and anaerobic fermentation is: -
_____.
 - A. in the use of oxygen
 - B. that the former requires breathing
 - C. that the latter uses organic molecules within the cell as final electron acceptors
 - D. that fermentation only produces alcohol
8. The primary structure of a protein is: -
 - A. The sequence of amino acids
 - B. The alpha-helix and beta-sheet formations
 - C. The overall 3D shape
 - D. The association of multiple polypeptides

9. The following components are the most abundant in biological membranes: -
- A. Carbohydrates
 - B. Proteins
 - C. Lipids
 - D. Vitamins
10. The vitamin essential for blood clotting is; -
- A. Vitamin A
 - B. Vitamin B12
 - C. Vitamin K
 - D. Vitamin D
11. The final electron acceptor in the electron transport chain is:
- A. NAD⁺
 - B. FAD
 - C. Oxygen
 - D. Water
12. The lipoprotein often referred to as "good" cholesterol is: -
- A. LDL
 - B. HDL
 - C. VLDL
 - D. Chylomicrons
13. The enzyme responsible for the conversion of 1,3-bisphosphoglycerate to 3-phosphoglycerate is: -
- A. Aldolase
 - B. Phosphoglycerate kinase
 - C. Pyruvate kinase
 - D. Enolase
14. An enzyme that catalyzes the conversion of citrate to isocitrate is: -
- A. Citrate synthase
 - B. Aconitase
 - C. Isocitrate dehydrogenase
 - D. Succinate dehydrogenase
15. An enzyme that catalyzes the conversion of α -ketoglutarate to succinyl-CoA is: -
- A. Citrate synthase
 - B. Isocitrate dehydrogenase
 - C. α -Ketoglutarate dehydrogenase
 - D. Malate dehydrogenase
16. Allosteric enzymes are regulated by:
- A. Substrate concentration
 - B. Products of the reaction
 - C. Molecules that bind at sites other than the active site
 - D. Competitive inhibitors

17. The transport process requires energy input in the form of ATP is: -
A. Simple diffusion
B. Facilitated diffusion
C. Active transport
D. Osmosis
18. One of the following hormones plays a significant role in regulating metabolism by increasing the basal metabolic rate (BMR): -
A. Thyroxine (T4)
B. Insulin
C. Glucagon
D. Prolactin
19. The liver is crucial for detoxification. Which enzyme system is primarily involved in this process?
A. Hexokinase
B. Cytochrome P450
C. Lactate dehydrogenase
D. ATP synthase
20. The primary role of the liver in glucose metabolism is: -
A. Storage of glucose as glycogen
B. Conversion of glucose to fatty acids
C. Production of ketone bodies
D. All of the above

SECTION II: SHORT ANSWER QUESTIONS **(30 MARKS)**

1. State the three main types of carbohydrates **[3 Marks]**
2. Distinguish between metabolism, anabolism and catabolism. **[6 Marks]**
3. Contrast between transamination and deamination of amino acids. **[4 Marks]**
4. State the role of NADH and FADH₂ in the electron transport chain **[4 Marks]**
5. Outline the structural organization of biological membranes. **[4 Marks]**
6. Differentiate between lock and key model and the induced fit model of enzyme action. **[4 Marks]**
7. State the various buffering systems in the human body. **[5 Marks]**

SECTION III: LONG ANSWER QUESTION **(20 MARKS)**

1. Fatty acid oxidation involves breakdown of fatty acids to generate energy;-
 - a) Explain five (5) physiological factors that influence the rate of fatty acid oxidation (10 marks)
 - b) Explain five (5) biochemical factors that influence the rate of fatty acid oxidation (10marks)

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