



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF NURSING & MIDWIFERY SCIENCES
BACHELOR OF SCIENCE IN NURSING
END OF MAY - JULY TRIMESTER EXAMINATIONS 2026**

BSN 124: Medical Biochemistry II

DATE: 4TH AUGUST 2026

Duration: 2 HOURS

Start: 9:00 AM

Finish: 11:00 AM

INSTRUCTIONS

- 1. This exam is out of 70 Marks**
- 2. This Examination comprises THREE Sections. Section I: Multiple Choice Questions
Section II: Short Answer Questions and Section III: Long Answer Questions**
- 3. Answer ALL Questions.**
- 4. Do not write on the question paper. Use the back of the answer booklet for any rough work**

SECTION I: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. Which plasma protein is primarily responsible for maintaining oncotic pressure in patients with liver disease?
 - A. Hemoglobin
 - B. Albumin
 - C. Globulin
 - D. Fibrinogen
2. Which amino acid property allows proteins to act as buffers in blood?
 - A. Hydrophobicity
 - B. Amphoteric nature
 - C. Insolubility
 - D. High molecular weight
3. Peptide bonds in proteins are formed between:
 - A. Two amino groups
 - B. Two carboxyl groups
 - C. Amino and carboxyl groups
 - D. Phosphate groups
4. Sickle cell disease results from alteration in which level of protein structure?
 - A. Primary structure
 - B. Secondary structure
 - C. Tertiary structure
 - D. Quaternary structure
5. Which lipid is the main storage form of energy in adipose tissue?
 - A. Phospholipids
 - B. Steroids
 - C. Triglycerides
 - D. Cholesterol
6. Cholesterol is clinically important because it serves as a precursor for:
 - A. Amino acids
 - B. Steroid hormones
 - C. Glycogen
 - D. RNA
7. The fluidity of cell membranes is mainly influenced by:
 - A. Cholesterol and phospholipids
 - B. DNA
 - C. Glycogen
 - D. Hemoglobin

8. Which membrane transport mechanism requires ATP to move substances against a concentration gradient?
- A. Diffusion
 - B. Osmosis
 - C. Active transport
 - D. Filtration
9. In prolonged fasting, mobilization of fatty acids from adipose tissue is stimulated mainly by:
- A. Insulin
 - B. Glucagon
 - C. Estrogen
 - D. Thyroxine
10. Deficiency of carnitine impairs beta-oxidation because carnitine is required for:
- A. Glycolysis
 - B. Transport of fatty acids into mitochondria
 - C. Protein synthesis
 - D. Cholesterol absorption
11. Ketone bodies are excessively produced in uncontrolled diabetes mellitus because of increased:
- A. Glycogenesis
 - B. Lipolysis
 - C. Protein synthesis
 - D. DNA replication
12. Which enzyme is the key regulatory enzyme in fatty acid synthesis?
- A. Lipase
 - B. Acetyl-CoA carboxylase
 - C. Carnitine acyltransferase
 - D. Hexokinase
13. Hyperlipidemia in diabetes mellitus commonly results from increased:
- A. Insulin activity
 - B. Fat breakdown and impaired lipid metabolism
 - C. Glycogen storage
 - D. DNA synthesis
14. Transamination reactions are important in amino acid metabolism because they:
- A. Produce glucose directly
 - B. Transfer amino groups
 - C. Form ketone bodies
 - D. Digest proteins

15. Hyperammonemia may occur in patients with defects in the:
- A. Glycolytic pathway
 - B. Urea cycle
 - C. TCA cycle
 - D. Electron transport chain
16. DNA differs from RNA because DNA contains:
- A. Ribose sugar
 - B. Uracil
 - C. Deoxyribose sugar
 - D. Amino acids
17. Enzymes increase the rate of biochemical reactions by:
- A. Increasing activation energy
 - B. Lowering activation energy
 - C. Consuming ATP
 - D. Changing equilibrium
18. Competitive enzyme inhibition occurs when the inhibitor:
- A. Binds irreversibly to the enzyme
 - B. Competes with substrate at the active site
 - C. Destroys the enzyme
 - D. Increases enzyme synthesis
19. Insulin promotes storage of nutrients mainly in the:
- A. Fasting state
 - B. Fed state
 - C. Starvation state
 - D. Stress response
20. Which tissue primarily relies on anaerobic glycolysis because it lacks mitochondria?
- A. Liver
 - B. Skeletal muscle
 - C. Erythrocytes
 - D. Brain

SECTION II: SHORT ASSAY QUESTIONS (30 MARKS)

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| 1. Describe the structural features of amino acids. | (5 Marks) |
| 2. Explain how defects in membrane transport proteins may lead to diseases such as cystic fibrosis. | (5 Marks) |
| 3. Discuss the quaternary structure of proteins | (5 Marks) |
| 4. Discuss the fates of ketone bodies formed during starvation | (5 Marks) |
| 5. Describe the structure and fluidity of biological membranes | (5 Marks) |
| 6. Discuss the role of enzymes in clinical diagnosis | (5 Marks) |

SECTION C: LONG ASSAY QUESTIONS (20 MARKS)

INSTRUCTIONS: Answer ONLY ONE Question

1. Explain the integration of metabolism in the liver, muscle, adipose tissue, and brain during feeding and fasting states. (20 Marks)
2. Describe the biochemical functions of the liver, brain, erythrocytes, muscle, and adipose tissue and discuss how disease conditions may alter their metabolism. (20 Marks)

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