

CHUKA

UNIVERSITY



UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN
NURSING**

NURU 119: MEDICAL BIOCHEMISTRY II

STREAMS: BSc. NURSING (UPGRADING)

TIME: 2 HOURS

DAY/DATE: TUESDAY 12/08/2025

8.30 A.M. – 10.30 A.M.

INSTRUCTIONS:

All questions are compulsory. Ensure that all your answers are properly numbered.

Part I: Multiple Choice Questions (MCQ): write the correct answer on the space provided in the booklet. Each MCQ in one mark.

Part II: Short Answer Questions – Answer questions following each other on the answer booklet.

Part III: Long Answer Questions: Answer any TWO questions. Answer each question on the answer booklet.

PART I: MCQ (20 MARKS)

1. Which of the following is a precursor for fatty acid synthesis?
 - a) Acetyl CoA
 - b) Propionyl CoA
 - c) Succinyl CoA
 - d) Acetoacetyl CoA
2. High rate of beta-oxidation in the liver leads to ketogenesis (ketone body synthesis). Which of the following condition result in ketogenesis
 - a) Uncontrolled Type I diabetes
 - b) Pregnancy
 - c) Starvation
 - d) All of the above

3. Which of the following are important for white blood cell recognition?
 - a) Glycoproteins
 - b) Glycosaminoglycans
 - c) Glycolipids
 - d) Proteoglycans
4. Which of the following enzyme is responsible for the conversion of glucose 1-phosphate to glucose 6-phosphate?
 - a) Epimerase
 - b) Phosphoglucomutase
 - c) Glycogen phosphorylase
 - d) Isomerase
5. Which of the following is not an important precursor of glucose in animals?
 - a) Pyruvate
 - b) Glucose 6-phosphate
 - c) Lactate
 - d) Glycerol
6. Which is the first step in the catabolism of most L-amino acids once they have reached the liver is promoted?
 - a) Glutamine synthase
 - b) Glutamate dehydrogenase
 - c) Glutaminase
 - d) Aminotransferases/Transaminases
7. Which of the following are exclusively glucogenic?
 - a) Lysine
 - b) Leucine
 - c) Threonine
 - d) Arginine
8. Long-chain fatty acids are oxidized step-wise in one-carbon unit starting from _____
 - a) Aliphatic end
 - b) Carboxyl end

- c) a and b
 - d) None of the mentioned
9. What is effect of increased levels of hydrogen ions in the inter-membrane space of the mitochondria?
- a) Decreased levels of chemiosmosis
 - b) Increased levels of water in inter-membrane space
 - c) Increase ATP production
 - d) Decreased levels of oxidative phosphorylation
10. Which of the following class of drugs reduce the levels of fatty acids circulating in the blood?
- a) Amphetamines
 - b) Thiazolidinediones
 - c) Synthetic cannabinoids
 - d) Cathinones
11. How many carbons are present in HMG co-A?
- a) 12
 - b) 8
 - c) 4
 - d) 6
12. Which of the following amino acids have an important role in the transport of amino group from peripheral tissues to the liver?
- a) Serine
 - b) Methionine
 - c) Glutamine
 - d) Arginine
13. Which of the following enzyme is defective in galactosemia- a fatal genetic disorder in infants?
- a) Glucokinase
 - b) Galactokinase
 - c) Galactose-1-Phosphate Uridyl transferase
 - d) UDP-Galactose 4- epimerase

14. Erythrocytes undergo glycolysis for the production of ATP. The deficiency of enzyme leads to hemolytic anemia?
 - a) Glucokinase
 - b) Phosphofructokinase
 - c) Phosphoglucomutase
 - d) Pyruvate Kinase
15. Glycolysis consists of three irreversible steps.
Which of the following enzyme-catalyzed reaction are not irreversible steps in glycolysis?
 - a) Hexokinase
 - b) Phosphofructokinase
 - c) Glyceraldehyde-3-phosphate kinase
 - d) Pyruvate kinase
16. The anti-obesity drug Orlistat inhibits
 - a) Pancreatic lipase
 - b) Lipoprotein lipase
 - c) Hormone-sensitive lipase
 - d) Phospholipase
17. Which of the following organs does not have glycogen storage?
 - a) Liver
 - b) Muscle
 - c) Intestine
 - d) Erythrocytes
18. Which of the following statement is false regarding glycogenesis?
 - a) Glycogen synthase is activated in the phosphorylated state
 - b) Glycogen synthase enzyme is inhibited by glucagon and epinephrine action
 - c) Protein phosphatase removes the phosphate group and activates the enzyme
 - d) Insulin promotes glycogen synthesis in liver and skeletal muscles
19. Familial hypercholesterolemia is a genetic disorder of cholesterol metabolism.
The defect lies in the.....
 - a) Transport of cholesterol from extrahepatic tissue to the liver
 - b) Impairment of cholesterol degradative pathway

- c) Impairment of uptake of cholesterol by tissues
- d) Impairment of HDL metabolism due to deficiency of Apo-A

20. A child is was brought to the hospital with the clinical presentation of mental retardation, blindness, and muscular weakness. The biochemical examination showed the accumulation of GM2 gangliosides in the tissues.

What is the possible cause of the disease?

- a) Tay Sachs Disease caused by Hexosaminidase A deficiency
- b) Fabry Disease caused by Alpha-Galactosidase deficiency
- c) Krabbe Disease caused by Beta-Galactosidase deficiency
- d) Gaucher Disease caused by Beta-Glucosidase deficiency

PART II: SHORT ANSWER QUESTIONS (30 MARKS)

1. Explain the pathogenesis of lactose intolerance. (5 marks)
2. Explain how alcohol degradation interferes with gluconeogenesis. (6 marks)
3. Explain how UDP-glucose is formed, and name its metabolic destinations. (5 marks)
4. Outline the metabolic uses of NADPH. (5 marks)
5. Explain the advantages and disadvantages of triacylglycerol and glycogen as stores of metabolic energy. (4 marks)
6. Explain the origin and significance of foam cells in atherosclerotic lesions. (5 marks)

PART III: ANSWER ANY TWO (2) QUESTIONS (20 MARKS)

1. (a) Explain the pathogenesis and treatment of urea cycle enzyme defects. (7 marks)
(b) Explain the use of asparaginase in leukemia. (3 marks)
2. (a) Explain the disease *acute intermittent porphyria* (AIP). (6 marks)
(b) Briefly describe the effect and laboratory findings of lead intoxication on heme biosynthesis. (4 marks)
3. (a) Explain, giving examples, the major therapeutic strategies for lowering LDL cholesterol. (6 marks)

(b) Explain why we need a minimum amount of protein in the diet, and the difference between glucogenic and ketogenic amino acids. (4 marks)

4. Explain the causation and significance of favism. (10 marks)

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