



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF NURSING & MIDWIFERY SCIENCES
BACHELOR OF SCIENCE IN NURSING
END OF SEPTEMBER -DECEMBER TRIMESTER EXAMINATIONS 2022**

BSN 213: MEDICAL BIOCHEMISTRY

DATE: 5th December 2022

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. The following enzymes do not participate in conversion of Lactic acid to Glucose, when three reactions of Glycolytic pathway are circumvented:-
 - A. Pyruvate Carboxylase
 - B. Phosphoenol pyruvate carboxy kinase
 - C. Pyruvate kinase
 - D. Glucose-6-phosphatase
2. The ratio that approximates the number of net molecule of ATP formed per mole of Glucose oxidized in presence of Oxygen to the net number formed in absence of Oxygen is:-
 - A. 4: 1
 - B. 10: 2
 - C. 12: 1
 - D. 18: 1
3. Compared to the resting state, vigorously contracting muscle shows:-
 - A. An increased conversion of pyruvate to lactate
 - B. Decreased oxidation of pyruvate of CO₂ and water
 - C. A decreased NADH/NAD⁺ ratio
 - D. Decreased concentration of AMP
4. Reduced glutathione functions in red blood cells (RBCs) to :-
 - A. Produce NADPH
 - B. Reduce methemoglobin to haemoglobin
 - C. Produce NADH
 - D. Reduce oxidizing agents such as H₂O₂
5. A compound serving a link between citric acid cycle and urea cycle is:-
 - A. Malate
 - B. Citrate
 - C. Succinate
 - D. Fumarate

6. The 2 nitrogen atoms in urea are contributed by:-
- A. Ammonia and glutamate
 - B. Glutamine and glutamate
 - C. Ammonia and aspartate
 - D. Ammonia and alanine
7. At a pH below the isoelectric point, an amino acid exists as:-
- A. Cation
 - B. Anion
 - C. Zwitterion
 - D. Undissociated molecule
8. An amino acid that does not take part in α helix formation is:-
- A. Histidine
 - B. Tyrosine
 - C. Proline
 - D. Tryptophan
9. Serum amylase is increased in:-
- A. Acute parotitis
 - B. Acute pancreatitis
 - C. Pancreatic cancer
 - D. All of these
10. Carnitine is synthesized from:-
- A. Lysine and methionine
 - B. Glycine and arginine
 - C. Aspartate and glutamate
 - D. Proline and hydroxyproline
11. Ketone bodies are synthesized in:-
- A. Adipose tissue
 - B. Liver
 - C. Muscles
 - D. Brain

12. Prostaglandins are synthesized in the body from:-
- A. Myristic acid
 - B. Arachidonic acid
 - C. Stearic acid
 - D. Lignoceric acid.
13. Main metabolic end product of cholesterol:-
- A. Coprosterol
 - B. 5-pregnenolone
 - C. Bile acid
 - D. Glycine
14. The following statement is FALSE regarding ketone bodies:-
- A. They may result from starvation
 - B. They are formed in kidneys
 - C. They include acetoacetic acid and acetone
 - D. They may be excreted in urine.
15. A manifestation of vitamin A deficiency is:-
- A. Painful joints
 - B. Night blindness
 - C. Loss of hair
 - D. Thickening of long bones
16. Fibre in the diet is beneficial in:-
- A. Hyperglycemia
 - B. Hypercholestrolemia
 - C. Colon cancer
 - D. All the above conditions
17. Phosphofructokinase key enzyme in glycolysis is inhibited by:-
- A. Citrate and ATP
 - B. AMP
 - C. ADP
 - D. TMP

18. Catecholamine hormones are synthesized in the:-

- A. Chromaffin cells of adrenal medulla
- B. Zona glomerulosa of adrenal cortex
- C. Zona fasciculate of adrenal cortex
- D. Zona reticularis of adrenal cortex

19. In thyroxine, tyrosine residues are iodinated at positions:-

- A. 1 and 3
- B. 2 and 4
- C. 3 and 5
- D. 4 and 6

20. Gout is a metabolic disorder of catabolism of:-

- A. Pyrimidines
- B. Purines
- C. Alanine
- D. Phenylalanine

SECTION II: SHORT ASSAY QUESTIONS (30 MARKS)

1. List all classified amino acids based on nutritional requirement in the body. (5 Marks)

2. Define:

- i. Metabolons (1 Mark)
- ii. Protein turnover (1 Mark)
- iii. Cofactors (1 Mark)

3. (i). Explain how Allopurinol works to decrease Uric Acid excretion. (4 Marks)

(ii). Highlight **FOUR** (4) key enzymes of gluconeogenesis (4 Marks)

4. Regarding fats

a. Explain why we require fats in our diet. (2 Marks)

b. Outline the outstanding differences between biosynthesis and β oxidation of fatty acids.

(3 Marks)

5. Explain:

- i). Substrate level phosphorylation (1 Mark)
- ii). Alkaptonuria disorder (2 Marks)
- iii). Wernicke-korsakoff encephalopathy disorder. (3 Marks)

6. Calculate the pH of 1 L solution containing 0.1 M formic acid and 0.1 M sodium formate before and after the addition of 1 mL of 5 M NaOH. How much would the pH change if the NaOH were added to 1L of pure water? (3 Marks)

SECTION C: LONG ASSAY QUESTIONS (20 MARKS)

INSTRUCTIONS : Answer ONLY ONE Question

- 1. (a) Describe the biosynthesis and metabolic effects of Catecholamine. (10 Marks)
- (b) Describe the fate of Propionyl-CoA in the β -oxidation of fatty acids. (10 Marks)
- 2. (a) Describe the detoxication of ammonia by urea cycle. (10 Marks)
- (b) Describe disorders of urea cycle and their management in hospital setting. (10 Marks)