AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES

DEPARTMENT OF NURSING AND MIDWIFERY SCIENCES

BACHELOR OF SCIENCE IN NURSING

END OF JANUARY-APRIL SEMESTER 2023 EXAMINATIONS

Course Unit: BSN 213: MEDICAL BIOCHEMISTRY

Date: 4th April 2023

Time: 2 Hours **Start: 11:15 A.M** **Finish: 1:15 A.M**

Instructions

1) This paper has three sections: Section A, Section B and Section C
2) Answer **ALL** questions in Section A and Section B and only one question in Section C
3) Use the University examination booklets provided
4) Re-writing the questions on your answer sheet is unnecessary

MULTIPLE CHOICE QUESTTIONS: SECTION A (1 MARKS EACH)

1. Debranching enzyme is absent in: -
   (A) Cori's disease
   (B) Andersen's disease
   (C) Von Gierke's disease
   (D) Her's disease
2. The carrier of citric acid cycle is: -
   (A) Succinate
   (B) Fumerate
   (C) Malate
   (D) Oxaloacetate
3. In glycogenesis, glucose should be converted to: -
   (A)Glucuronic acid
   (B) Pyruvic acid
   (C) UDP glucose
   (D)Sorbitol
4. Epimers of glucose include: -
   (A) Fructose
   (B) Galactose
   (C) Ribose
   (D) Deoxyribose
5. The main site for oxidative deamination are: -
   (A) Liver and Kidney
   (B) Skin and Pacrease
   (C) Intestine and Mammary gland
   (D) Lungs and Spleen
6. The enzyme carbomyl phosphate synthetase requires: -
   (A) Mg^{++}
   (B) Ca^{++}
   (C) Na^{+}
   (D) K^{+}

7. The fatty acid present in cerebrosides is: -
   (A) Lignoceric acid
   (B) Valeric acid
   (C) Caprylic acid
   (D) Behenic acid
8. Synthesis of prostaglandins is inhibited by: -
   (A) Glucocorticoids
   (B) Aspirin
   (C) Indomethacin
   (D) All of these
9. Lactate dehydrogenase 1 and Lactate dehydrogenase 2 are elevated in: -
   (A) Myocardial infarction
   (B) Liver disease
   (C) Kidney disease
   (D) Brain disease
10. A hormone secreted from posterior pituitary is: -
   (A) Vasopresin
   (B) Thyrotropic hormone
   (C) Prolactin
   (D) Adrenocorticotropic hormone
11. Hexokinase is —— dependent enzyme: -
   (A). Zinc
   (B) Magnesium
   (C) Sodium dependent
   (D) Iron
12. The following statements is false about gluconeogenesis: -
   (A). From the hydrolysis of tri-acyl-glycerol, fatty acids can be used as a carbon source
   (B). From red blood cells, lactate can be used as a carbon source
   (C). From the hydrolysis of tri-acyl-glycerol, glycerol is converted to glucose in gluconeogenesis
   (D). From muscle vigorous muscle activity, lactate can be used as a carbon source

13. The following protein is required for de novo synthesis of glycogen: -

(A). Glycoprotein

(B). Glycogenin

(C). Proteoglycan

(D). Glucogenin

14. The following statement best describes the Beta-oxidation of fatty acids: -

(A) One acetyl CoA is produced in each in each turn of β-oxidation spiral

(B) β-oxidation of fatty acids is an extra mitochondrial process

(C) The enzyme present in the form of multi-enzyme complexes

(D) The intermediates are carried by acyl carrier protein

15. A four-year-old boy was noted by the parents to have darkening of the urine to an almost black color when it was left standing. The following is most likely elevated in this patient: -

(A) Methylmalonate

(B) Homogentisate

(C) Phenylpyruvate

(D) α-Ketoisovalerate

16. The following is biological uncoupler of oxidative phosphorylation:-

(A) 2,4-dichlorophenoxyacetic acid

(B) Keratin

(C) Thermogenin

(D) 2,4-trinitrophenol

17. Three of the bases found in nucleic acids are pyrimidines and two are purines. The following is correct: -

	Pyrimidines	Purines
(A)	adenine and thymine	cytosine and guanine
(B)	adenine and cytosine	thymine and guanine
(C)	uracil and thymine	adenine and guanine
(D)	cytosine and uracil	thymine and cytosine

18. An enzyme of the citric acid cycle also found outside the mitochondria is: -

(A) Isocitrate dehydrogenase

(B) Citrate synthetase

(C) α-Ketoglutarate dehydrogenase

(D) Malate dehydrogenase

19. In the synthesis of glycogen from glucose the reversible step is: -

(A) Glucose → glucose 6-phosphate

(B) Glucose 6-phosphate → glucose 1-phosphate

(C) Glucose 1-phosphate → UDP glucose

(D) UDP glucose → glycogen

20. The following is not coenzymes: -

(A) Ubiquinone

(B) CoA

(C) Pyruvate dehydrogenase

(D) Lipoic acid

SHORT ASSAY QUESTIONS: SECTION B (30 MARKS)

Attempt ALL Questions

1. Mention all the amino acids metabolised to form ketone bodies during periods of fasting/starvation. [3 Marks]
2. Outline **THREE** (3) uses of nicotinamide adenine dinucleotide phosphate hydrogen. generated in Pentose shunt [3 Marks]
3. While strolling down a street, you observe a man that appears to be in his mid-40's eating foie gras and mussels and drinking what appears to be a pint of beer. You notice that the man is rubbing his swollen ankle and big toe on the same foot and appears to be in great discomfort.
   a). What is the cause of this gentleman's discomfort? [1½ Marks]
   b). Explain the cause of what you have identified as the gentleman's problem. [3½ Marks]
4. Explain how Allopurinol works to decrease Uric Acid excretion. [5 Marks]

5. Highlight **FOUR** (4) key enzymes of gluconeogenesis [4 Marks]

6. Briefly explain why we require fats in our diet. [2 Marks]

7. Outline the outstanding differences between biosynthesis and β oxidation of fatty acids. [3 Marks]

8. Give the carbon structure of the following fatty acids:

i) 18:2 $^{\Delta(9, 12)}$ [2Marks]

ii) 20:4 $^{\Delta(5, 8, 11, 14)}$ [3 Marks]

LONG ASSAY QUESTIONS: SECTION C (20 MARKS)

Answer **ONLY ONE** Question

1. (a) Discuss the enzymatic reactions of TCA cycle. [10 Marks]

   (b) Calculate the total amount of ATP generated under normal conditions from oxidation of glucose through glucose glycolysis up the end of TCA cycle. Show how you arrive at your answer. [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]