



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF NURSING AND MDWIFERY SCIENCES
BACHELOR OF SCIENCE IN NURSING
END OF SEMESTER EXAMINATIONS AUGUST 2021**

UNIT CODE BSN 213 & BSM 213

UNIT NAME MEDICAL BIOCHEMISTRY

DATE: 27TH JULY 2021

TIME: 2 HOURS

START: 2.00PM

FINISH: 4.00PM

Instructions

See per each section

SECTION A: MULTIPLE CHOICE QUESTIONS (MCQS) 20 MARKS

Instructions: chose one correct answer

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 main site for oxidative deamination are -----
(A) Liver and Kidney
(B) Skin and Pancreas
(C) Intestine and Mammary gland
(D) Lungs and Spleen

3. The enzyme carbomyl phosphate synthetase requires -----
(A) Mg^{++}
(B) Ca^{++}
(C) Na^{+}
(D) K^{+}

4. A water soluble vitamin deficient in egg is -----
(A) Thiamin
(B) Riboflavin
(C) Ascorbic acid
(D) Cobalamin

5. The fatty acid present in cerebrosides is -----
(A) Lignoceric acid
(B) Valeric acid
(C) Caprylic acid
(D) Behenic acid

6. Synthesis of prostaglandins is inhibited by-----
(A) Glucocorticoids
(B) Aspirin
(C) Indolemethacin
(D) All of these

7. What is the cause of hemolytic anemia in Glucose-6-phosphate deficiency?
A. Decreased ATP in erythrocytes
B. Decreased free radicals in erythrocytes
C. Increased sodium concentration in erythrocytes
D. Increased free radicals in erythrocytes

8. Formation of one molecule of glucose from pyruvate requires _____
- A. 4 ATP, 2 GTP and 2 NADH
 - B. 3 ATP, 2 GTP and 2 NADH
 - C. 4 ATP, 1 GTP and 2 NADH
 - D. 2 ATP, 2 GTP and 2 NADH
9. Ethanol is oxidized to acetaldehyde in the liver cytoplasm by _____
- A. Alcohol dehydrogenase
 - B. Alcohol carboxylase
 - C. Pyruvate carboxylase
 - D. Pyruvate kinase
10. Which of the following statements is true about PFK-1?
- A. It is stimulated by AMP and ADP
 - B. It is stimulated by citrate and ATP
 - C. It is inhibited by AMP and ADP
 - D. It is stimulated by citrate and ADP
11. Which of the following protein is required for de novo synthesis of glycogen?
- A. Glycoprotein
 - B. Glycogenin
 - C. Proteoglycan
 - D. Glucogenin
12. In response to glucagon and epinephrine, cells undergo a series of changes in signal-transducing molecules that phosphorylates and activates glycogen phosphorylase. Which of the following enzyme is responsible for covalent modification of glycogen phosphorylase?
- A. Protein kinase A
 - B. Phosphorylase kinase
 - C. Protein kinase C
 - D. Protein kinase B
13. Insulin activates the pentose phosphate pathway. Which of the following enzyme is activated by insulin action?
- A. Transketolase
 - B. Glucose-6-P dehydrogenase
 - C. Transaldolase
 - D. Phosphogluconate dehydrogenase
14. The glutathione cycle is the conversion of oxidized glutathione to reduced glutathione in the presence of NADPH. Which of the following enzyme catalyzes this reaction
- A. Glutathione peroxidase
 - B. Glutathione dehydrogenase
 - C. Glutathione reductase
 - D. Glutathione synthetase

15. Which of the following is the correct sequence of electron acceptors in ETC for production of ATP?
- Cyt b, c, a, a₃
 - Cyt a, a, b, c
 - Cyt c, b, a, a₃
 - Cyt b, c, a₃, a
16. A person is born with a mutation that causes their cells to not have the ability to produce the NADH dehydrogenase complex, the complex that allows the electron transport chain to make ATP from NADH. Will this patient be able to produce any energy at all from the ETC?
- Yes—NAD⁺ can still enter the ETC.
 - Yes—FADH₂ can still enter the ETC.
 - No—NADH is necessary for the ETC to use other molecules to make ATP.
 - No—FAD can still enter the ETC.
17. Which of the following is true regarding the Henderson-Hasselbalch equation?
- The pH of the solution is always greater than the pK_a of the solution
 - As the ratio of conjugate base to acid increases, the pH increases
 - The hydrogen ion concentration can never equal the acid dissociation constant
- I and II
 - II and III
 - II only
 - I only
18. Most of the important functional groups in biological molecules contain
- Oxygen and/or nitrogen and are acidic
 - Oxygen and a phosphate
 - Nitrogen and a phosphate
 - Oxygen and/or nitrogen and are polar
19. Which of the following amino acid is sweet in taste?
- Glycine
 - Alanine
 - Glutamic acid
 - None of these
20. Calcium level in the blood is regulated by the:
- Thyroid.
 - Parathyroid.
 - Posterior pituitary.
 - A and B.

SECTION B: SHORT ANSWER QUESTIONS (SAQS) (20 MARKS)

Attempt ALL Questions

1. a). Name all the amino acids which can be metabolised to form ketone bodies during periods of fasting/starvation. (3 Marks)
b). Explain briefly the requirements of amino acid metabolism. (2 Marks)
2. 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 do you think is the cause of this gentleman's discomfort? (½ Marks)
 - b). Describe briefly the cause of what you have identified as the gentleman's problem. (2½ Marks)
 - c). Explain briefly ONE approach of managing the gentleman's problem. (2 Marks)
3. a.) Which reaction steps of HMP are involved in generation of NADPH? (3½ Marks)
b.) Outline THREE uses of NADPH. (1½ Marks)
4. (a) Briefly 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)

SECTION C : LONG ANSWER QUESTIONS (LAOS) (30 Marks)

Answer any THREE Questions

1. 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. Describe the features of active site of an enzyme. (10 Marks).
3. Describe the fate of pyruvate in glucose metabolism. (10 Marks)
4. Describe the composition of respiratory chain. (10 Marks)