



UNIVERSITY EXAMINATIONS
FIRST YEAR EXAMINATION FOR THE AWARD OF THE
DEGREE OF BACHELOR OF SCIENCE IN NURSING
SECOND SEMESTER 2022/2023
[JANUARY-APRIL, 2023]

NUR 116: BIOCHEMISTRY II

STREAM: Y1S2

TIME: 3 HOURS

DAY: TUESDAY, 9:00 – 12:00 PM

DATE: 04/04/2023

INSTRUCTIONS

1. Do not write anything on this question paper.

SECTION A (20 Marks)

Attempt all questions

1. Mc'Ardle syndrome involves a deficiency of which of the following enzymes
 - (A) Debranching enzyme
 - (B) Muscle phosphorylase
 - (C) Hepatic glycogen synthase
 - (D) Hepatic phosphorylase
2. Fischer's 'lock and key' model of the enzyme action implies that
 - (A) The active site is complementary in shape to that of substance only after interaction.
 - (B) The active site is complementary in shape to that of substance
 - (C) Substrates change conformation prior to active site interaction
 - (D) The active site is flexible and adjusts to substrate
3. During starvation, blood or tissue levels of all the following are elevated, except?
 - (A) Glucagon
 - (B) Ketone bodies
 - (C) Insulin
 - (D) Free fatty acids
4. An amphibolic pathway among the following is
 - (A) HMP shunt
 - (B) Glycolysis
 - (C) Gluconeogenesis
 - (D) Citric acid cycle

5. Cori's cycle transfers
 - (A) Glucose from muscles to liver
 - (B) Lactate from muscles to liver
 - (C) Lactate from liver to muscles
 - (D) Pyruvate from liver to muscles
6. During starvation, ketone bodies are used as a fuel by
 - (A) Erythrocytes
 - (B) Liver
 - (C) Brain
 - (D) All of these
7. Obesity increases the risk of
 - (A) Hypertension
 - (B) Diabetes mellitus
 - (C) Cardiovascular disease
 - (D) All of these
8. The intermediate in hexose monophosphate shunt is
 - (A) D-Ribulose
 - (B) D-Arobinose
 - (C) D-xylose
 - (D) D-lyxose
9. Dihydroxyacetone phosphate and glyceraldehyde-3-phosphate are interconverted by?
 - (A) Triose isomerase
 - (B) Phosphotriose isomerase
 - (C) Diphosphotriose isomerase
 - (D) Dihydroxyacetone phosphorylase
10. The reaction succinyl COA to succinate requires
 - (A) CDP
 - (B) ADP
 - (C) GDP
 - (D) NADP+
11. Under anaerobic conditions the glycolysis one mole of glucose yields ___ moles of ATP.
 - (A) One
 - (B) Two
 - (C) Eight
 - (D) Thirty
12. Two important by-products of HMP shunt are?
 - (A) NADH and pentose sugars
 - (B) Pentose sugars and 4 membered sugars
 - (C) NADPH and pentose sugars
 - (D) Pentose sugars and sedoheptulose

13. Which complex of the electron transport chain in cellular respiration does not directly impact the intermembrane space's pH?
- (A) Complex I
 - (B) Complex II
 - (C) Complex III
 - (D) Complex IV
14. Disruption of which process will have the greatest impact on the number of electron carriers used by the electron transport chain?
- (A) Glycolysis
 - (B) Anaerobic pathways
 - (C) Citric acid cycle
 - (D) Formation of FADH₂
15. An important reaction for the synthesis of amino acid from carbohydrate intermediates is transamination which requires the cofactor:
- (A) Thiamin
 - (B) Riboflavin
 - (C) Niacin
 - (D) Pyridoxal phosphate
16. Control of urea cycle involves the enzyme:
- (A) Carbamoyl phosphate synthetase
 - (B) Ornithine transcarbamoylase
 - (C) Argininosuccinase
 - (D) Arginase
17. Ammonia is transported from muscles to liver mainly in the form of
- (A) Free ammonia
 - (B) Glutamine
 - (C) Asparagine
 - (C) Alanine
18. Synthesis of the following enzymes is increased during starvation.
- (A) Digestive enzymes
 - (B) Gluconeogenic enzymes
 - (C) Urea cycle enzymes
 - (D) Glucokinase
19. Activation of fatty acids requires all the following except
- (A) ATP
 - (B) Coenzyme A
 - (C) Thiokinase
 - (D) Carnitine
20. During each cycle of β -oxidation
- (A) One carbon atom is removed from the carboxyl end of the fatty acid
 - (B) One carbon atom is removed from the methyl end of the fatty acid

- (C) Two carbon atoms are removed from the carboxyl end of the fatty acid
- (D) Two carbon atoms are removed from the methyl end of the fatty acid

SECTION B (40 MARKS)

Attempt all questions

1. Explain how the glycolytic pathway is regulated by Phosphofructokinase I.
(6 marks)
2. Describe two fates of pyruvate that is generated in the glycolytic pathway.
(8 marks)
3. State the name and causes of three disorders of glycogen storage.
(6 marks)
4. Haemolytic anaemia is a disorder associated with the HMP-shunt.
Explain. (5 marks)
5. Describe the Cori's cycle and state its metabolic significance.
(7 marks)
6. Cholesterol biosynthesis is regulated by HMG-CoA reductase activity.
Explain how the activity of this enzyme is controlled.
(8 marks)

SECTION C (40 MARKS)

Attempt any two questions

1. Describe the flow of electrons and generation of ATP in the Electron transport chain
(20 marks)
2. Explain the metabolic changes that occur during short-term and prolonged starvation
(20 marks)
3. Describe the hexose monophosphate (HMP) shunt and highlight its importance.
(20 marks)