

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR BACHELOR OF SCIENCE IN NURSING

NURU 119: MEDICAL BIOCHEMISTRY II

STREAMS: BSC (NURS)

TIME: 2 HOURS

DAY/DATE: THURSDAY 05/12/2019

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS:

SECTION A (20 MARKS) - ANSWER ALL QUESTIONS IN THIS SECTION

1. Tissues form lactic acid from glucose. This phenomenon is termed as
 - (a) Aerobic glycolysis
 - (b) Oxidation
 - (c) Oxidative phosphorylation
 - (d) Anaerobic glycolysis
2. The formation of citrate from oxaloacetate and acetyl CoA is
 - (a) Oxidation
 - (b) Reduction
 - (c) Condensation
 - (d) Hydrolysis
3. Acetyl CoA is not used for the synthesis of
 - (a) Fatty acid
 - (b) Cholesterol
 - (c) Pyruvic acid
 - (d) Citric acid

4. The following co-enzyme is needed for the oxidative decarboxylation of ketoacids:
 - (a) NADP⁺
 - (b) TPP
 - (c) Folate coenzyme
 - (d) Biotin coenzyme
5. Two conditions in which gluconeogenesis is increased are
 - (a) Diabetes mellitus and atherosclerosis
 - (b) Fed condition and thyrotoxicosis
 - (c) Diabetes mellitus and Starvation
 - (d) Alcohol intake and cigarette smoking
6. In conversion of Lactic acid to Glucose, three reactions of Glycolytic pathway are circumvented, which of the following enzymes do not participate?
 - (a) Pyruvate Carboxylase
 - (b) Phosphoenol pyruvate carboxy kinase
 - (c) Pyruvate kinase
 - (d) Glucose-6-phosphatase
7. Electron transport and phosphorylation can be uncoupled by compounds that increase the permeability of the inner mitochondrial membrane to
 - (a) Electrons
 - (b) Protons
 - (c) Uncouplers
 - (d) All of these
8. Which of the following reactions is unique to gluconeogenesis?
 - (a) Lactate-Pyruvate
 - (b) Phosphoenol-pyruvate-pyruvate
 - (c) Oxaloacetate-phosphoenol-pyruvate
 - (d) Glucose-6-phosphate Fructose-6-phosphate
9. The synthesis of glucose from pyruvate by gluconeogenesis
 - (a) Requires the participation of biotin
 - (b) Occurs exclusively in the cytosol

- (c) Is inhibited by elevated level of insulin
 - (d) Requires oxidation/reduction of FAD
10. Long chain fatty acids are first activated to Acyl-coA in
- (a) Cytosol
 - (b) Microsomes
 - (c) Nucleus
 - (d) Mitochondria
11. Carnitine is synthesized from
- (a) Lysine and methionine
 - (b) Glycine and arginine
 - (c) Aspartate and glutamate
 - (d) Proline and hydroxyproline
12. The enzymes of β -oxidation of fats are found in
- (a) Mitochondria
 - (b) Cytosol
 - (c) Golgi apparatus
 - (d) Nucleus
13. Which one of the following statements concerning glucose metabolism is correct?
- (a) The conversion of Glucose to lactate occurs only in the R.B.C
 - (b) Glucose enters most cells by a mechanism in which Na^+ and glucose are co-transported
 - (c) Pyruvate kinase catalyses an irreversible reaction
 - (d) An elevated level of insulin leads to a decreased level of fructose 2, 6-bisphosphate in hepatocyte
14. Compared to the resting state, vigorously contracting muscle shows
- (a) An increased conversion of pyruvate to lactate
 - (b) Decreased oxidation of pyruvate of CO_2 and water
 - (c) A decreased NADH/NAD⁺ ratio
 - (d) Decreased concentration of AMP
15. Long chain fatty acids are first activated to Acyl-CoA in
- (a) Cytosol
 - (b) Microsomes

- (c) Nucleus
 - (d) Mitochondria
- 16) Long chain fatty acids penetrate the inner mitochondrial membrane
- (a) Freely
 - (b) As acyl-CoA derivative
 - (c) As carnitine derivative
 - (d) Requiring Na dependent carrier
17. The main sites for oxidative deamination are
- (a) Liver and kidney
 - (b) Skin and pancreas
 - (c) Intestine and mammary gland
 - (d) Lung and spleen
18. A ketogenic amino acid is
- (a) Valine
 - (b) Cysteine
 - (c) Leucine
 - (d) Threonine
19. Which of the following statements regarding T.C.A cycle is true?
- (a) It is an anaerobic process
 - (b) It occurs in cytosol
 - (c) It contains no intermediates for Gluconeogenesis
 - (d) It is amphibolic in nature.
20. Dehydrogenases involved in HMP shunt are specific for
- (a) NADP+
 - (b) NAD+
 - (c) FAD
 - (d) FMN.

SECTION B (30 MARKS): ANSWER ALL QUESTIONS IN THIS SECTION.

1. Name **Three** enzymes that catalyze the irreversible reactions that regulate glycolysis.

(3

marks)

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2. Name **Three** non-carbohydrate sources of Glucose used in the process of Gluconeogenesis. (3 marks)
3. State **Three** additional functions of Gluconeogenesis other than Glucose formation. (3 marks)
4. Identify **Three** body tissues with the greatest Pentose phosphate pathway activity. (3 marks)
5. The primary purpose of pentose phosphate shunt pathway is the generation of reducing equivalents and pentose sugars. Name the **two** reducing equivalents and **two** pentose sugars generated by this pathway. (6 marks)
6. Amino acids that cannot be synthesized by the body and therefore should be supplied through the diet are referred to as Essential Amino Acids (EAA). Name any **Three** Essential Amino acids (EAAs). (3 marks)
7. Amino acids are divided Two groups based on their body metabolic processes. Name the **Two** groups of Amino Acids and give an example of each. (3 marks)
8. Name **Three** body tissues that can readily metabolize ketone bodies to derive energy. (3 marks)
9. Why is the pentose Phosphate pathway is crucial to the survival of erythrocytes and White Blood Cells? (3 marks)

SECTION C (20 MARKS): ANSWER any ONE question

30. Describe the process of Gluconeogenesis. (20 marks)
 31. Describe the metabolic process of the Citric Acid Cycle. (20 marks)
 32. Describe the process of β -oxidation of fats. (20 marks)
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