

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

**RESIT/SPECIAL EXAMINATION**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN NURSING**

**NURS 116: MEDICAL BIOCHEMISTRY II**

**STREAMS:**

**TIME: 2 HOURS**

**DAY/DATE : FRIDAY 17/09/2021**

**11.30 A.M – 1.30 P.M**

**INSTRUCTIONS:**

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**INSTRUCTIONS:** All questions are compulsory. Ensure that all your answers are properly numbered.  
**Part I: Multiple Choice Questions (MCQ):** Choose the most correct answer. Each MCQ is 2 marks.  
**Part II: Long Answer Questions:** Answer each question on the answer booklet.

**PART I: MULTIPLE CHOICE QUESTIONS (30 MARKS)**

1. Ketosis is partly ascribed to:
  - a. Over production of glucose
  - b. Under production of glucose
  - c. Increased carbohydrate utilisation
  - d. Increased fat utilisation
  - e. Increased pyruvate in liver
  
2. Which of the following amino acids on degradation produces a glucogenic intermediate of TCA cycle and ketone body?
  - a. Glycine
  - b. Serine
  - c. Alanine
  - d. Cysteine
  - e. Phenylalanine
  
3. All of the following compounds are intermediates of TCA cycle except:

- a. Malate
  - b. Pyruvate
  - c. Oxaloacetate
  - d. Fumarate
  - e. Succinate
4. The rate limiting step in cholesterol biosynthesis is:
- a. Squalenesynthetase
  - b. Mevalonate kinase
  - c. HMG-CoA synthetase
  - d. HMG-CoA reductase
  - e. Thiolase
5. 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. Phosphoenolpyruvatecarboxykinase
  - c. Pyruvate kinase
  - d. Glucose-6-phosphatase
  - e. Fructose-1, 6-biphosphatase
6. MacArdle's disease involves a deficiency of which enzyme?
- a. Acid maltase
  - b. Glucose-6-phosphatase
  - c. Hepatic phosphorylase
  - d. Muscle phosphorylase
  - e. Branching enzyme
7. Phenylketonuria is an inherited disorder due to deficiency of the enzyme:
- a. Transaminase
  - b. Homogentisate oxidase
  - c. Phenylalanine hydroxylase
  - d. Isomerase
  - e. None of the above
8. In Rapaport-Leubering shunt in erythrocytes, 2,3-biphosphoglycerate (2,3-BPG) is produced from which intermediate in glycolytic pathway?
- a. 3-phosphoglycerate
  - b. 2-phosphoglycerate
  - c. 1,3-biphosphoglycerate
  - d. Glyceraldehyde-3-P
  - e. Dihydroxyacetone-P
9. A pathway that requires NADPH as a cofactor is:
- a. Fatty acid oxidation
  - b. Extramitochondrial *de novo* fatty acid synthesis
  - c. Ketone bodies formation
  - d. Glycogenesis
  - e. Gluconeogenesis

10. Depletion of  $\alpha$ -ketoglutarate during increased  $\text{NH}_3$  influx leads to the formation of:
- Glutamine
  - Proline
  - Arginine
  - Histamine
  - Serine
11. Which of the following is a substrate for aldolase activity in glycolytic pathway?
- Glyceraldehyde-3-P
  - Glucose-6-P
  - Fructose-6-P
  - 1,3-diphosphoglycerate
  - Fructose-1,6-bi-P
12.  $\beta$ -oxidation of odd-carbon fatty acid chain produces:
- Succinyl-CoA
  - Propionyl-CoA
  - acetyl-CoA
  - Malonyl-CoA
  - acetoacetyl-CoA
13. All of the following tissues are capable of using ketone bodies, except:
- Brain
  - Renal cortex
  - Red blood cells
  - Cardiac muscle
  - Skeletal muscle
14. Quantitatively the most important enzyme involved in formation of  $\text{NH}_3$  from amino acids in humans is:
- L-amino acid oxidase
  - Serine dehydratase
  - Glutamate dehydrogenase
  - Histidase
  - Desulfhydrase
15. A liver biopsy from an infant with hepatomegaly, stunted growth, hypoglycaemia, lactic acidosis, hyperlipidaemia revealed accumulation of glycogen having normal structure. A possible diagnosis would be:
- Branching enzyme deficiency
  - Acid maltase deficiency
  - Liver phosphorylase deficiency
  - Debranching enzyme deficiency
  - Glucose-6-phosphatase deficiency

**PART II: LONG ANSWER QUESTIONS (50 MARKS)**

1. Coronavirus Disease of 2019 (Covid-19) has posed a serious threat to the global public health, with daily mortality and morbidity increasing exponentially. Discuss Covid-19 under the following headings:
    - (a) Metabolic complications in affected tissues/organs
    - (b) Preventive measures
    - (c) “Silent spreaders”
    - (d) Variant strains of covid-19 (20 marks)
  2. What is gluconeogenesis? Give an outline of reactions involved. List biological significance of this pathway? (15marks)
  3. Discuss purine nucleotide catabolism and its clinical relevance. (15 marks)
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