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(*University of Choice*)

# MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(MAIN CAMPUS)

## UNIVERSITY EXAMINATIONS (MAIN PAPER)
## 2021/2022 ACADEMIC YEAR

## SECOND YEAR SECONDSEMESTEREXAMINATIONS

## FOR THE DEGREE OF
## BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCES

**COURSE CODE:** BML 221

**COURSE TITLE:** METABOLISM

**DATE:** 20/04/2022 **TIME:** 8.00 -10.00 AM

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## INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, **A, B** and **C,** carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**).**Answer all questions. DO NOT WRITE ON THE QUESTION PAPER.**

**TIME: 2 Hours**

**Section A. (20marks)**

1. Which of the following enzyme is considered as defective in galactosemia, a Fatal genetic disorder in infants

A. Hexokinase
B. Galactokinase
C. Galactose -1-phosphate uridyltransferase
D. UDP-galactose -4-epimerase

2. Erythrocytes undergo glycolysis for production of ATP. Deficiency of which enzyme leads to hemolytic anemia?

A. Enolase
B. Phosphofructokise-1
C. Phosphoglucomutase
D. Pyruvate kinase

3. Which of the following sugars is absorbed by facilitate transport

A. Galactose
B. Fructose
C. Arabinose
D. Glucose

4. The rate of absorption of sugars by small intestine is highest for

A. Pentoses
B. Disaccharides
C. Polysaccharides
D. Hexoses

5. An essential for conversion of glucose to glycogen in the liver is

A. UTP
B. GTP
C. Pyruvate kinase
D. guanosine

6. Which of the following glucose transporters {GLUTs) are important in insulin dependent uptake?

A. GLUT-1
B. GLUT-2
C. GLUT-3
D. GLUT-4

7. Which of the following metabolites negatively regulate pyruvate kinase

A. Fructose -1-6-Bis phosphate
B. Citrate
C. Acetyl CoA
D. Alanine

8. Glycogen synthesis is increased by

A. Cortisone
B. Insulin
C. Growth hormones
D. Epinephrine

9. What high energy phosphate compound is formed in citric acid cycle through substrate level phosphorylation?

A. ATP
B. GTP
C. CTP
D. UTP

10. Which of the following is not a substrate for gluconeogenesis?

A. Lactate
B. Alanine
C. Acetyl CoA
D. Glyceral

11. Histamine, a chemical mediator of allergy under and anaphylaxis is synthesized from amino acid histidine by which of the following process

A. Deamination
B. Decaboxylation
C. Transamination
D. Dehydrogenation

12. The diet of a child suffers from marple syrup urine disease (MSUD}, should be low in which one of the amino acid content.

A. Branched chain amino acids
B. Phenylalanine
C. Methionine
D. Tryptophan

13. Urea is synthesized in

A. cytoplasm
B. mitochondrion
C. both cytoplasm and mitochondrion
D. both cytoplasm and nucleus

14. Blood urea decreases in all of the following conditions, except,

A. Liver cirrhosis
B. Pregnancy
C. Renal failure
D. Urea cycle disorder

15. Which of the following statement about glutamate dehydrogenase is correct

A. Required for transamination reactions
B. Universal present in all cells of the body
C. Can utilize either NAD+/NADP+
D. Catalyses conversion of glutamate to glutamine

16. Hydroxylation of phenylalanine to tyrosine require all, except

A. Glutathione
B. Tetrahydrobiopterine
C. Molecular oxygen
D. NADPH

17. What is an allosterric regulator of acetyl CoA carboxylase

A. Fatty acids
B. ATP
C. Citrate
D. acetyl CoA

18. Glutamine:Phosphoriboylpyrophosphateamidotrasfarase (GPRT) is inhibited by the following except

A. AMP
B. GMP
C. ADP
D. Phosphate riboylpyruphosphate (PRPP)

19. Which of the following condition may results ion ketogenesis

A. Uncontrolled type 1 diabetes
B. Pregnancy
C. Starvation
D. All of the above

20. Which of the following amino acid is not required for creatine synthesis

A. methionine
B. serine
C. glycine
D. arginine

**SECTION B. (40 Marks)**

1. Citing specific examples, describe the various levels at which diagnosis of inherited metabolic disease can be made (4 marks)
2. Outline the Glycerol phosphate -3-phosphate shuttle (4 marks)
3. Explain regulation phosphor-fructokinase-1(PFK-1)(4 marks)
4. Explain how ammonia from the brain is transported to the liver(4 marks)
5. Briefly discuss the clinical aspects of fructose metabolism(4 marks)
6. Write a note on GLUT-4(4 marks)
7. Discuss significance of metabolism(4 marks)
8. Differentiate between competitive and non competitive inhibition(4 marks)
9. Outline steps of β-oxidation of fatty acids(4 marks)
10. Describe conversion of guanosine to uric acid(4 marks)

**SECTION C (60 Marks)**

1. Describe citric acid cycle. (20 marks)
2. Outline the synthesis of phosphotidyl choline. (20 marks
3. Discuss disorders associated with urea cycle. (20 marks