MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2019/2020 ACADEMIC YEAR

MAIN EXAMINATION

FOR THE DEGREE OF BACHELOR OF MEDICAL LABORATORY SCIENCES

COURSE CODE: BML 221

COURSE TITLE: METABOLISM

DATE: 7TH DECEMBER 2020 **TIME: 8.00 -10.00AM**

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**

MMUST observes ZERO tolerance to examination cheating

METABOLISM PAPER

SECTION A: Answer all questions in this section.

Q1. An Amphibolic pathway among the following is

a) HMP shunt
b) Glycolysis
c) The Cori cycle
d) TCA cycle

Q2. Congenital galactosaemia can lead to

a) Mental retardation
b) Premature cataract
c) Death
d) All of the above

Q3. During starvation, ketone bodies are used as fuels by

a) Brain
b) Erythrocytes
c) Liver
d) All of the above

Q4. 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

Q5. Which of the following is located in the mitochondria?

a) Cytochrome oxidase
b) Succinate dehydrogenase
c) Dihydrolipoyl dehydrogenase
d) All of the above

Q6. The conversion of alanine to glucose is termed

a) Glycolysis
b) Oxidative decarboxylation
c) Specific dynamic action
d) Gluconeogenesis

Q7. Phenylketonuria can be detected by

a) Toluidine blue test
b) Ferric chloride test
c) Benedict's test
d) Rothera's test

Q8. Which one of the following is a rate limiting enzyme of gluconeogenesis?

a) Hexokinase
b) Phsophofructokinase
c) Pyruvate carboxylase
d) Pyruvate kinase

Q9. Which of the following hormones inhibits the hormone-sensitive lipase enzyme?

a) Prostaglandins
b) Epinephrine
c) Glucagon
d) ACTH

Q10. Glucose uptake by liver cells is

a) Energy-consuming b) A saturable process
c) Insulin-dependent d) Insulin-independent

Q11. Which of the following is an enzyme required for glycolysis?

a) Phosphotriose isomerase
b) Pyruvate carboxylase
c) Glucose-6-phosphatase
d) Succinate dehydrogenase

Q12. Oxidative decarboxylation of pyruvate requires

a) $NADP^+$
b) Pyridoxal phosphate (PLP)
c) Cytochromes
d) Co-enzyme A

Q13. **Variegate porphyria** is caused by

a) Decrease in δ-aminolevulinic acid (ALA) synthase
b) Decrease in ferrochelatase
c) Decrease in protoporphyrinogen oxidase
d) Decrease in porphobilinogen deaminase

Q14. An allosteric enzyme responsible for controlling the rate of TCA cycle is

a) Aconitase
b) Isocitrate dehydrogenase
c) Succinate dehydrogenase
d) α-ketoglutarate dehydrogenase

Q15. Acetyl CoA carboxylase regulates fatty acid synthesis by which of the following mechanism?

a) Allosteric regulation
b) Covalent modification
c) Induction and repression
d) All of the above

Q16. Bile salts make emulsification with fat for the action of

a) Amylase
b) Lipase
c) Trypsin
d) Pepsin

Q17. **Lesch-Nyhan syndrome** is due to the lack of the enzyme:

a) Hypoxanthine-guanine phosphoribosyl transferase
b) Xanthine oxidase
c) Adenine phosphoribosyl transferase
d) Adenosine deaminase

Q18. The major determinant of the overall rate of denovo purine nucleotide biosynthesis is the concentration of

a) 5-phosphoribosyl 1-pyrophosphate
b) 5-phospho β-D-ribosylamine
c) Glycinamide ribosyl-5-phosphate
d) Formylglycinamide ribosyl-5-phosphate

Q19. Uridine diphosphate glucose (UDPG) is

a) Required for metabolism of galactose
b) Required for synthesis of glucuronic acid
c) A substrate for glycogen synthetase
d) All of the above

Q20. Which one of the following is a rate limiting enzyme of gluconeogenesis?

a) Hexokinase b) Phsophofructokinase
c) Pyruvate carboxylase d) Pyruvate kinase

SECTION B: Answer all questions in this section

Q1. State the coenzyme involved in

i) Oxidation-reduction reactions (1mk)
ii) Carrier of acyl group (1mk)
iii) Transfers of groups to and from amino acids (1mk)
iv) Carboxylation or decarboxylation reactions (1mk)

Q2. Explain the Glycerol-3-phosphate shuttle. (4mks)

Q3. Discuss the diagnosis of metabolic diseases. (4mks)

Q4. Discuss Maple Syrup Urine disease (MSUD). (4mks)

Q5. Describe the Cori cycle. (4mks)

Q6. Describe the distribution and characteristics of Glucose transporter 2 (GLUT2) (4marks)

Q7. State the biomedical significance of Hexose monophosphate shunt. (4marks)

Q8. Describe β-oxidation of fatty acids with odd number carbon atoms (4mks)

Q9. Show how adenosine and guanosine are converted to uric acid (4mks)

Q10. Explain how ammonia produced in body tissues is transported to the liver. (4marks)

SECTION C: Answer all questions in this section

Q1. Outline glycolytic reactions. Discuss the significance of glycolysis. (20mks)

Q2. Discuss the Urea Cycle and urea cycle disorders (UCDs). (20mks)

Q3. Outline the synthesis of both Triglycerides and Phospholipids. (20mks)