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(*University of Choice*)

MASINDEMULIROUNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2022/2023 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER MAIN EXAMINATIONS

FOR DIPLOMA OF MEDICAL BIOTECHNOLOGY

COURSE CODE **BBD 225**
COURSE TITLE: **INTERMEDIARY METABOLISM**

DATE: 20TH APRIL 2023 **TIME: 08.00 – 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. **DO NOT WRITE ON THE QUESTION PAPER**
TIME: 2 Hours

This Paper Consists of 4 Printed Pages. Please Turn Over.

SECTION A: Multiple Choice Questions (20Marks)

1.Which of the following statements is **TRUE** about the Salvage pathway

a) Results in the formation of Uric acid

b) It involves synthesis of pyrimidine nucleotides from free purine bases, which are salvaged from dietary sources and tissue breakdown

c) Adenine phosphoribosyl transferase and Hypoxanthine guanine phosphoribosyl transferase are the enzymes involved

d) Hypoxanthine is broken down to XMP and a PPi

2. The cyclized derivative of glutamate is _____

a) Proline

b) Arginine

c) Glutamine

d) Serine

3. Which of the following is a non-essential amino acid?

a) Methionine

b) Threonine

c) Lysine

d) Cysteine

4. which one of the is **TRUE** about Von-Gierke's disease

a) The HMP shunt pathway is overactive

b) It is an acquired disease

c) it's a disorder of amino acid metabolism

d) Characterized by low levels of uric acid

5. Glutamate is metabolically converted to α-ketoglutarate and NH4+ by a process _____

a) Oxidative deamination

b) Transamination

c) Reductive deamination

d) Deamination

6. Free ammonia combined with glutamate to yield glutamine by the action of _____

a) Glutaminase

b) Glutamine synthase

c) Glutamate dehydrogenase

d) Amino transferase

7. Urea cycle converts _____

a) Keto acids into amino acids

b) Amino acids into keto acids

c) Ammonia into a less toxic form

d) Ammonia into a more toxic form

8. Which of the following are the products of decarboxylation

a) Glutamate, Urea, Ammonia

b) Thiamine pyrophosphate, NAD

c) Dopamine, Tyramine, Histamine

d) Histidine, Tyrosine and tryptophan

9. Which is the first step in the catabolism of most L-amino acids once they have reached the liver is promoted?

a) Amino transferases

b) Glutaminase

c) Glutamine synthase
d) Glutamate dehydrogenase
10. The combined action of aminotransferase and glutamate dehydrogenase is referred as _____
a) Oxidative deamination
b) Transamination
c) Reductive deamination
d) Transdeamination
11. Glutamine is converted to glutamate and NH4+ by _____
a) Amino transferases
b) Glutaminase
c) Glutamine synthase
d) Glutamate dehydrogenase
12. Which of the following operates at an important intersection of carbon and nitrogen metabolism?
a) Amino transferases
b) Glutaminase
c) Glutamine synthase
d) Glutamate dehydrogenase
13. Which of the following hydrolyzes successive amino-terminal residues from short peptides?
a) Aminopeptidase
b) Enteropeptidase
c) Glutamine synthase
d) Glutamate dehydrogenase
14. Which of the following yields acetyl coA directly?
a) Phenylalanine
b) Isoleucine
c) Lysine
d) Alanine
15. Which of the following produces pyruvate?
a) Leucine
b) Isoleucine
c) Lysine
d) Alanine
16. Which of the following produces α-ketoglutarate?
a) Leucine
b) Threonine
c) Methionine
d) Proline
17. Which of the following produce succinyl co-A?
a) Leucine
b) Isoleucine
c) Arginine
d) Alanine.
18 In Lesch-Nyhan syndrome_____
a) Less production of uric acid is witnessed in early stages of life
b) The deficient enzyme is Adenine phosphoribosyl transferase
c) There is Hypoxanthine Guanine Phospho Ribosyl Transferase (HGPRT) deficiency

d) Guanine is salvaged GMP and PPi

19. Urea production occurs almost exclusively in _____

a) Kidneys

b) Liver

c) Blood

d) Urine

20. What are the products of urea cycle?

a) One molecule of urea, one molecule of ammonia, one molecule of ATP and one molecule of fumaric acid

b) One molecule of urea, one molecule of AMP, two molecules of ADP and one molecule of fumaric acid

c) One molecule of aspartic acid, one molecule of ammonia, one molecule of ATP and one molecule of fumaric acid

d) Two molecules of urea, two molecules of ammonia, one molecule of ATP and one molecule of fumaric acid

SECTION B: Short Answer Questions (40 Marks)

1. Differentiate metabolism, catabolism and anabolism (8mks)
2. Discuss the regulation of metabolic pathways (8mks)
3. a. Define transamination (1mks)
   b. What is the co- factor involved in transamination process (1mk)
   c. Name two enzymes of clinical significance involved in this process and describe the reactions they catalyze using a structural diagram (6mks)
4. Describe the two types of deamination, giving examples (8mks)
5. Compare and contrast between purine and pyrimidine biosynthesis(8mks)

SECTION C: Long Answer Questions (60 Marks)

1. Describe the urea cycle (20mks)

2. Discuss the major Metabolic disorders (20mks)

3.
   a) Differentiate between metabolism, catabolism and anabolism (6mks)
   b) Describe gout disease (6mks)
   c) Differentiate between ketogenic and glycogenic amino acids (8mks)