(*University of Choice*)

MASINDEMULIROUNIVERSITY OF

SCIENCE AND TECHNOLOGY

(MMUST)

MAIN EXAMINATION

(MAIN CAMPUS)

UNIVERSITY MAIN EXAMINATIONS

2021/2022 ACADEMIC YEAR

SONMAPS

FIRST YEAR SECOND SEMESTER

COURSE CODE: **NMM 127**

COURSE TITLE: **MEDICAL BIOCHEMISTRY I**

DATE: *THURSDAY, 21 APRIL 2022* **TIME:** *08:00 HRS – 11:00 HRS*

INSTRUCTIONS TO CANDIDATES:

ANSWER ALL QUESTIONS IN SECTION A, SECTION B AND ONLY TWO (2) QUESTIONS IN SECTION C.

SECTION A:

ANSWER ALL QUESTIONS (20 MARKS):

1. Phosphofructokinase-1 is
   (a) An enzyme of glycolysis
   (b) Inhibited by fructose-6-phosphate
   (c) An allosteric enzyme of glycolysis
   (d) Activated by ATP

2. Which one of the following statements is correct regarding pyruvate dehydrogenase?
   (a) It is present in cytosol
   (b) It is a multienzyme complex
   (c) It is multi enzyme complex present in mitochondria
   (d) Acetyl-CoA is its substrate
3. Which one is the largest particulate of the cytoplasm?
   (A) Lysosomes
   (B) Mitochondria
   (C) Golgi apparatus
   (D) Endoplasmic reticulum
4. Degradative processes are categorized under the heading of?
   (A) Anabolism
   (B) Catabolism
   (C) Metabolism
   (D) None of the above
5. Which one among the following is the best example of a pentose sugar?
   (A) Dihydroxyacetone
   (B) Ribulose
   (C) Erythrose
   (D) Glucose
6. The reaction catalyzed by α-ketoglutarate dehydrogenase in the citric acid cycle requires
   (A) NAD^+
   (B) $NADP^+$
   (C) ADP
   (D) ATP
7. The pentose sugar present mainly in the heart muscle is
   (A) Lyxose
   (B) Ribose
   (C) Arabinose
   (D) Xylose

8. Polysaccharides are:
   (A) Polymers
   (B) Acids
   (C) Proteins
   (D) Oils
9. What is the general test for detection of carbohydrates?
   (A) Iodine test
   (B) Molisch test
   (C) Barfoed's test
   (D) Osazone test
10. Cerebrosides mostly consist of which sugar?
   (A) Glucose
   (B) Fructose
   (C) Galactose
   (D) Arabinose
11. Benedict's test is less likely to give weakly positive results with concentrated urine due to the action of
   (A) Urea
   (B) Uric acid
   (C) Ammonium salts
   (D) Phosphates
12. Excessive intake of ethanol increases the ratio:
   (A) NADH: NAD^+
   (B) NAD^+: NADH
   (C) $FADH_2$: FAD
   (D) FAD : $FADH_2$
13. Proteins contain
   (A) Only L- α - amino acids
   (B) Only D-amino acids
   (C) DL-Amino acids
   (D) Both (A) and (B)
14. Oxidative decarboxylation of pyruvate requires
   (A) NADP+
   (B) Cytochromes
   (C) Pyridoxal phosphate
   (D) CoA-SH

15. Dehydrogenase enzymes of the hexose monophosphate shunt are
    (A) NAD+ specific
    (B) NADP+ specific
    (C) FAD specific
    (D) FMN specific
16. Sulphur containing amino acid is
    (A) Methionine
    (B) Leucine
    (C) Valine
    (D) Asparagine
17. An aromatic amino acid is
    (A) Lysine
    (B) Tryptophan
    (C) Taurine
    (D) Arginine
18. A Zwitterion is
    (A) Positive ion
    (B) Negative ion
    (C) Both (A) and (C)
    (D) None of these.
19. Million's test is used for identification of
    (A) Tyrosine
    (B) Tryptophan
    (C) Proline
    (D) Arginine
20. Which of the following has the highest cholesterol content?
    (A) Egg yolk
    (B) Egg white
    (C) Meat
    (D) Fish

SECTION B:

ANSWER ALL QUESTIONS IN THIS SECTION. EACH QUESTION CARRIES 10 MARKS (TOTAL OF 40 MARKS):

1. Outline 5 factors that could influence the activity of enzymes in Biochemical processes. **(10 Marks)**

2. Stating its biological significance, discuss Cori-cycle. **(10 Marks)**

3. What are the major classes of carbohydrates? Explain the basis of each classification. **(10 Marks)**

4. Using Haworth projections, indicate the functional group of the following biomolecules.

   a) D-glucose. **(2 Marks)**

   b) Raffinose. **(2 Marks)**

   c) L- Fructose. **(2 Marks)**

   d) Glyceraldehyde-3-phosphate. **(2 Marks)**

   e) Fructose-1,6-bisphosphate. **(2 Marks)**

SECTION C:

ANSWER ANY TWO (2) QUESTIONS FROM THIS SECTION (TOTAL OF 40 MARKS):

1. In digestion of dietary lipids, ingested molecules are broken down by lipases into free fatty acids that enter the mitochondria for β-oxidation:
   a. Define β-oxidation. *(2 Marks)*

   b. Describe β-oxidation of oleic acid. *(15 Marks)*

   c. What are the ***three (3)*** oxidation products that result from β-oxidation of fatty acids with odd numbered carbon atoms? *(3 Marks)*

2. Describe citric acid cycle. *(20 Marks).*

3. Proteins are important biomolecules needed for normal cellular functions.

   a. Define essential amino acids. Give 10 examples of essential amino acids. *(8 Marks).*
   b. With appropriate examples in each case, discuss the hierarchy of proteins. *(8 Marks).*
   c. State the structural difference between hemoglobin and myoglobin. What are their functions? *(4 Marks).*

4. Stating the differences, discuss glycogenesis and glycogenolysis in living systems. *(20 Marks)*

*****THE END*****