REV-00
MBT/32/40

2017/12

M. Sc. BIOTECHNOLOGY
SEMESTER-I
BIOCHEMISTRY
MBT - 102

Duration: 3 Hrs. Marks: 70

Part : A (Objective) = 20
Part : B (Descriptive) = 50

[PART-B : Descriptive]

Duration: 2 Hrs. 40 Mins. Marks: 50

[Answer question no. One (1) & any four (4) from the rest]

1. Write the general structure of amino acid. How are amino acid classified based on R-group? Give an example of each type? 10

2. What are the physical forces stabilizing the structure of protein? In what way a protein can be denatured? 10

3. Write a note on enzyme nomenclature? Explain how allosteric interaction lead to protein inhibition 10

4. Define oxidative phosphorylation and photophosphorylation. Give a schematic flow chart for glycolysis. What is the net production of ATP during partial oxidation of glucose? 2+6+2= 10

5. Write an overview on the catabolism of amino acids and represent the process schematically? 10

6. Define carbohydrates and glycosidic linkage. Draw the structure of starch. Write the bypass reactions of gluconeogenesis mentioning the enzymes catalyzing those reactions. 2+3+5= 10

7. Give a short note on the components of election transport chain. Explain chemiosmotic hypothesis. Give the reactions of TCA where NAD^+ is reduced to NADH 4+3+3= 10

8. Give the classification of lipids with suitable example. What types of plants undergo CAM and why? Give the schematic flow chart of C4 pathway. 3+3+4= 10

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M. Sc. BIOTECHNOLOGY

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[PART-A : Objective]

Choose the correct answer from the following : 1×20=20

1. Enzymes having slightly different structure but performing identical activity are
   a. Holoenzymes
   b. Apoenzymes
   c. Isoenzymes
   d. Coenzymes

2. The enzyme enterokinase helps in the conversion of
   a. Caseinogen into casein
   b. Trypsinogen to trypsin
   c. Pepsinogen to pepsin
   d. Proteins into polypeptides

3. The catalytic efficiency of two different enzymes can be compared by the formation of
   a. Formation of the product
   b. Km value
   c. Molecular size of the enzymes
   d. p H of optimum value

4. 3-D structure of a protein can be determined by
   a. NMR
   b. X-Ray crystallography
   c. Both a and b
   d. Spectroscopy

5. Myoglobin is a
   a. Protein with primary structure
   b. Protein with secondary structure
   c. Protein with tertiary structure
   d. Protein with quaternary structure

6. Peptide bond is
   a. Rigid with partial double bond character
   b. Planar, covalent
   c. Covalent
   d. All the above

7. Tertiary structure is maintained by
   a. Peptide bond
   b. Hydrogen bond
   c. Disulphide bond
   d. All the above

8. A nucleoside is composed of
   a. A base+ a sugar
   b. A base+ a sugar + phosphate
   c. A base+ a phosphate
   d. None of these

9. In a 55 year old man who has been diagnosed with cirrhosis of liver, Ammonia is not getting detoxified and can damage brain, which of the following amino acid can covalently bind ammonia, transport and store in a nontoxic form?
   a. Aspertate
   b. Glutamate
   c. Serine
   d. Cysteine

10. Which of the following is a common nitrogen acceptor for all reactions involving transaminases
    a. α -ketoglutarate
    b. Pyruvate
    c. Oxaloacetate
    d. Acetoacetate

11. The general formula for carbohydrate is
    a. $(CH_2O)_n$
    b. $(C_4H_2O)_n$
    c. $(C_6H_2O)_n$
    d. None of the above

12. What is the net production of ATP from 1 molecule of Palmitic acid?
    a. 38
    b. 8
    c. 121
    d. 123

13. How many co-factors are required for the activity of α-ketogluterate dehydrogenase?
    a. 10
    b. 5
    c. 4
    d. 7

14. Which of the following enzyme of gluconeogenesis is found only in liver?
    a. Glucose 6 phosphatase
    b. PEP carboxykinase
    c. Fructose 1,6 bisphosphatase
    d. All of the above

15. How many isomers glucose can have due to the presence of 4 asymmetric carbon atom?
    a. 16
    b. 15
    c. 14
    d. 4

16. Which of the following substrates derived from adipose tissues contributes to net gluconeogenesis in mammalian liver?
    a. Alanine
    b. Glutamate
    c. Glucose
    d. Glycerol

17. Which of the following statement is incorrect?
    a. Aerobically oxidative decarboxylation of pyruvate forms acetate that enters the citric acid cycle
    b. In anaerobic muscles, pyruvate is converted to lactate
    c. Reduction of pyruvate to lactate generates a coenzyme essential for glycolysis
    d. Under anaerobic conditions pyruvate does not form because glycolysis does not occur.

18. For fixing 3 molecules of CO_2, how many NADPH and ATP are required?
    a. 3 NADPH and 3 ATP
    b. 6 NADPH and 6 ATP
    c. 6 NADPH and 9 ATP
    d. None of the above

19. Which of the following reaction/s is not catalyzed by NADH dehydrogenase
    a. Pyruvate to lactate
    b. Pyruvate to acetyle Co-A
    c. Glyceraldehyde 3 phosphate to 1,3 bisphosphoglycerate
    d. All of the above

20. Which complex of electron transport chain involves a Q – cycle?
    a. Complex IV
    b. Complex III
    c. Complex II
    d. Complex I

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UNIVERSITY OF SCIENCE & TECHNOLOGY, MEGHALAYA

[PART (A) : OBJECTIVE]

Duration : 20 Minutes

Serial no. of the main Answer sheet

Course : .....

Semester : ..... **Roll No :** .....

Enrollment No : ..... **Course code :** .....

Course Title : .....

Session : 2017-18 **Date :** .....

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Instructions / Guidelines

- The paper contains twenty (20) / ten (10) questions.
- Students shall tick (✓) the correct answer.
- No marks shall be given for overwrite / erasing.
- Students have to submit the Objective Part (Part–A) to the invigilator just after completion of the allotted time from the starting of examination.

Full Marks	Marks Obtained
20	

Scrutinizer's Signature *Examiner's Signature* *Invigilator's Signature*