REV-00
MBT/11/16 2014/01

M.Sc. BIOTECHNOLOGY
First Semester
Biochemistry
(MBT - 03)

Duration: 3Hrs. **Full Marks: 70**

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

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins. **Marks: 50**

1) Write short notes on the following: (any ***five***) **2×5=10**

a) Galactosemia *b)* Essential fatty acids *c)* Light reaction
d) Saponification *e)* Chloroplasts *f)* Biological roles of wax
g) Alanine transaminase

2) Answer the following questions: (any ***five***) **3×5=15**

a) Write in brief about the enzymes involved in liver and cardiac diseases.
b) How is pentose phosphate pathway regulated?
c) What do you mean by enzyme immobilization? Explain
d) What is the importance of TCA cycle? How many ATPs are generated from five molecules of acetylCoA?
e) What are phospholipids? Describe the biological importance of phospholipids.
f) Calculate an expression for the work done in reversible isothermal expansion of an ideal gas.
g) Calculate the p^H and p^{OH} of 0.03M solution of HCl at 25^OC.

3) Answer the following questions: (any ***five***)

a) What is Alkaptonuria? How it can be treated? What are its clinical manifestations? 2+1+2=5
b) Describe the regulation of purine biosynthesis. 5
c) What is photosynthesis? Explain the Z-scheme. 2+3=5
d) Define the terms Gibb's free energy and Helmholtz free energy. Discuss the variation of ΔG with variation in temperature and pressure. 2+3=5
e) Describe the different Applications of enzymes in food and pharmaceutical industry. 5
f) Compare and contrast between glycogen and starch. 5
g) Glyoxylate cycle does not occur in animals. Why? Explain glyoxylate cycle. 1+4=5

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(The figures in the margin indicate full marks for the questions)

Duration: 20 minutes **Marks – 20**

PART A- Objective Type

I. Choose the correct options from the following: **1×20=20**

1. Which is the initial enzyme involved in Calvin cycle?

a) RUBISCO b) Ligase

c) Hexokinase d) Phosphatase

2. What is produced in the light reaction of photosynthesis?

a) ATP and NADPH b) Glucose

c) CO_2 d) H_2O

3. Which of the substances represents an unsaturated fatty acid?

a) Palmitate b) Stearate

c) Choline d) Oleate

4. Which enzyme is defective in case of fructosuria?

a) Hexokinase b) Glukokinase

c) Fructokinase d) Glycogen phosphorylase

5. Lyases, a class of enzyme, catalyses

a) Hydrolysis reaction

b) Group transfer reaction

c) Oxidation and reduction reaction

d) Addition of groups to double bond and vice versa

6. The enzyme involved in liver disease is

a) Alanine transaminase b) Pyruvate kinase

c) Aspartate transaminase d) All of the above

7. α- amylase have an application in

a) Food industry
b) Paper industry
c) Textile industry
d) All the above

8. Lactic acid dehydrogenase (LDH) is essential for lactic acid formation. This is an example of

a) Chemienzyme
b) Abzyme
c) Apoenzyme
d) Isoenzyme

9. Alkapotonuria is also known as:

a) Red urine disease
b) Brown urine disease
c) Black urine disesase
d) None of the above

10. Which of the following enzymes in glycolysis catalyzes a reaction that is essentially non-reversible?

a) Enolase
b) Phosphofructokinase
c) Triose phosphate isomerase
d) phosphohexose isomerase

11. In the pentose phosphate pathway

a) Only the C-1 carbon of glucose is oxidized to CO_2.
b) All the carbon of the carbons of glucose is oxidized to CO_2.
c) No decarboxylaation occurs.
d) C-4 and C-5 of glucose is oxidized to CO_2.

12. Which of the following hormones doesnot act by a second messanger system?

a) Glucagon
b) Epinephrine
c) Follicle stimulating hormone
c) Testosterone

13. Glucose residues in amylopectin are linked by

a) β(1→4)
b) α(1→4), α(1→6)
c) α(1→4), β(1→6)
d) β(1→4), β(1→6)

14. Binding energy of ES complex lowers the activation energies of E,S reaction by

a) Changing reaction equilibria.
b) Covalent interaction with substrates.
c) Binding only with the solvent molecules.
d) Forming weak interactions with substrates.

15. Second messanger is

a) ATP
b) cAMP
c) GTP
d) ATP and AMP

16. Which one of the following bases has the largest hydrogen bonding possibility?

a) Adenine b) Guanine

c) Cytosine d) Uracil

17. The p^H of 0.04 M HNO_3 is

a) 2.00 b) 4.00

c) 1.398 d) 2.52

18. Which of the following is an intensive property?

a) ΔU b) ΔH

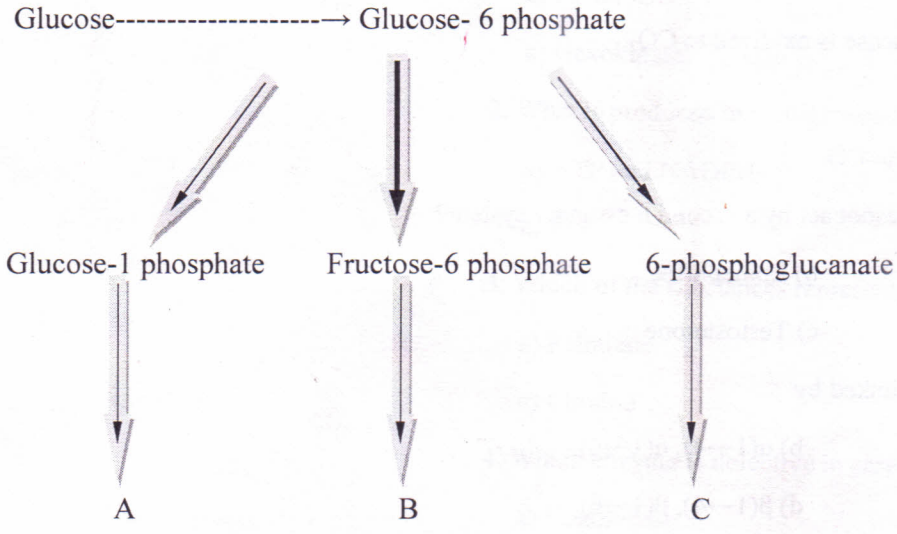
c) ΔG d) C_p

19. For a adiabatic process

a) T= constant b) q= 0

c) q= constant d) w=0

20. What are A, B and C in the following reactions?



a) Pyruvate, ribose-5 phosphate, glycogen

b) Ribose-5 phosphate, glycogen, pyruvate

c) Glycogen, pyruvate, Ribose-5 phosphate

d) Glycogen, citrate, Ribose-5 phosphate

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