SEAT No._____ No. of Printed Pages : 03

[143/A-21]

SARDAR PATEL UNIVERSITY

B.Sc. Semester – V (Microbiology) Examination: November 2021

US05CMIC22: Microbial Metabolism

Date: 24-11-2021, Wednesday **Time:** 3 to 5 Pm **Total marks: (70)**

Instructions: (1) It is compulsory to attempt all four questions.

(2) Marks of each question are indicated on the right.

Q. 1. Answer the following multiple choice questions: **(10)**

1. Which of the following is example of high energy bonds?
   (a) Anhydride bonds (b) Enol bonds
   (c) Ester bonds (d) None of these all
2. Which amongst the following component bears lowest redox potential?
   (a) Fumerate (b) Oxygen
   (c) Cytochrome a (d) NAD^+
3. Which of the following membrane transport mechanism transport substrates across the membrane in opposite directions?
   (a) Uniport (b) Symport
   (c) Antiport (d) All of these
4. The enzymes which act only on one isomer exhibit _____.
   (a) Stereo specificity (b) Substrate specificity
   (c) Reaction specificity (d) None of these all
5. Which reactions are playing important role in Pentose Phosphate Pathway?
   (a) Transketolase (b) Transaldolase
   (c) Both (a) and (b) (d) None of these all
6. Regulation of the glycolysis is governed by allosteric regulation of
   (a) Hexokinase (b) PFK-1
   (c) Pyruvate kinase (d) All of these
7. Anaerobic fermentation of amino acids by Clostridia is called
   (a) Aerobic respiration (b) Dehydrogenation
   (c) Stickland reaction (d) Proteolysis
8. Which of the following enzyme catalyzes the last reaction of β-oxidation of saturated fatty acid?
   (a) Acyl-CoA dehydrogenase (b) Enoyl-CoA hydrase
   (c) Thiolase (d) None of these

9. Which carrier molecule is used as acceptor for acetyl and malonyl group in fatty acid biosynthesis?
   (a) Acetyl CoA
   (b) ATP
   (c) Acyl carrier protein
   (d) None of these all
10. Which of the following compound is used as a carrier molecule in peptidoglycan biosynthesis?
   (a) Acyl carrier protein
   (b) PEP
   (c) Isoprenoid carrier lipid
   (d) Carrier protein HPr

Q. 2. Fill in the Blanks and True- False: (08)

1. The relation between ΔG, ΔH and ΔS is expressed as $\Delta G =$ _____.
2. F_1 component of ATP synthase is integral to the membrane. (True or False)
3. A low Km value indicates a strong affinity between enzyme and substrate. (True or False)
4. The multiple forms an enzyme catalyzing the same reaction are called _____.
5. Phosphoenolpyruvate is converted to pyruvate by the enzyme _____.
6. All transaminases require pyridoxal phosphate for their activity. (True or False)
7. _____ is a multistep process used to synthesize glucose from other precursor compounds.
8. Chorismate is derived from erythrose-4-phosphate and acetyl CoA. (True or False)

Q. 3. Answer the following short questions: (Attempt any ten) (20)

1. What is biochemical thermodynamics?
2. Draw structure of ATP and label it.
3. What is photophosphorylation? Give suitable example.
4. Give any four salient features of active site of enzyme.
5. Explain turnover number with suitable example.
6. What is covalent modification?
7. Name the enzymes involved in regulation of Citric acid cycle.
8. Explain oxidative deamination with suitable example.
9. Name the unique reactions of glyoxylate pathway.
10. What is reductive TCA cycle?
11. Give names of four unique enzymes involved in gluconeogenesis.
12. Give example of use of biochemical mutants in studying biosynthesis.

Q. 4. Answer the following long questions: (Attempt any four) **(32)**

(1) Discuss oxidative phosphorylation in detail.
(2) Describe active transport mechanism of membrane transport.
(3) Discuss enzyme structure and specificity.
(4) Enlist factors affecting enzyme activity and discuss any three in detail.
(5) Enlist the pathways used for glucose metabolism and discuss EMP pathway.
(6) Discuss in detail β- oxidation of palmitic acid.
(7) Discuss biosynthesis of peptidoglycan.
(8) Discuss biosynthesis of aromatic amino acids.

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