

[106/115]

SARDAR PATEL UNIVERSITY

M. Sc. Biochemistry/Industrial Biotechnology Ist Semester Examination

Friday, 26th October 2018

Time: 10.00 a.m to 1.00 p.m.

Paper: PS 01CBIC23/ PS01 CIBT23 (Cellular Metabolism)

Total Marks: 70

Q1. Choose the most correct answers for the following questions: (08)

1. Which of the following enzyme releases CO₂ during fermentation of glucose?

(a) Pyruvate carboxylase	(b) Pyruvate decarboxylase
(c) Alcohol dehydrogenase	(d) Pyruvate dehydrogenase
2. Which of the following enzyme/s is involved in regulation of gluconeogenesis?

(a) Pyruvate Carboxylase	(b) Fructose 1,6 Bisphosphatase
(c) both a & b	(d) none of the above
3. PRPP is synthesized by

(a) Ribose phosphate pyrophosphate kinase	(b) Ribose phosphate pyrophosphatase
(c) Ribose phosphate pyrophospho dehydrogenase	(d) None of the above
4. Changing in concentration of which of the following controls whether glucose-6-phosphate in the cell will undergo glycolysis or pentose phosphate pathway?

(a) PUFA.	(b) Glucose	(c) NAD	(d) NADPH
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5. The conversion of Acetyl CoA to Malonyl CoA requires which of the following?

(a) Biotin	(b) NADPH	(c) Adenosine Diphosphate	(d) H ₂ O
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6. Which of the following metabolic adaptation takes place in starvation?

(a) Glycolysis is inhibited in most tissues	(b) Glucagon activates Glycogen phosphorylase in liver
(c) Lipase is activated, raising free fatty acid levels in blood	(d) All of the above
7. Which cofactor is required by Transketolase in Pentose Phosphate Pathway?

(a) Thiamine pyrophosphate	(b) FAD
(c) NAD	(d) Lipoate
8. Carbamoyl phosphate synthase I, is allosterically activated by

(a) Carbamoyl phosphate	(b) Glutamate
(c) Acetyl CoA	(d) N-acetylglutamate

①

(P.T.O.)

Q2. Answer any SEVEN of the following:

(7 X 2 = 14 Marks)

1. Why the reaction catalyzed by PFK-1 is considered to be the first committed step to Glycolysis?
2. Explain: In active skeletal muscles and in submerged plant tissues, pyruvate is not oxidized to acetate but reduced to lactate. Why?
3. What are the effects of Insulin and Glucagon on Lipase?
4. What enzymes and coenzymes constitute pyruvate dehydrogenase complex?
5. Which coenzyme/s are used by different isozymes of acyl CoA dehydrogenases? How many ATPs are produced by oxidation of this coenzyme/s?
6. Which enzyme/s are regulatory in fatty acid anabolism & catabolism?
7. Which amino acids are found in higher concentration in blood? Why?
8. Discuss in brief the usefulness of allopurinol.
9. What are synthases and synthetases? Are they the same or different? How?

Q3.(a) Explain the reciprocal regulation of glycolysis and gluconeogenesis. (06)

(b) Explain the chemiosmotic hypothesis and production of ATP by ATP synthetase. (06)

OR

Q3. (b) Explain the oxidative phase of pentose phosphate pathway. (06)

Q4. (a) How fatty acids are activated for oxidation? Explain the complete oxidative metabolism of Palmitoyl CoA and discuss its energetics. (06)

(b) Give an account on structure of Fatty acid synthase complex and narrate the functions of each of the seven proteins in the complex. (06)

OR

Q4 (b) What are ketone bodies? Write sites & reactions of ketone bodies' formation and utilization. (06)

Q5 (a) Explain the site, reactions and importance of urea cycle. (06)

(b) Explain the toxicity of ammonia and role of glutamine synthase to make nontoxic carrier of ammonia. (06)

OR

Q5 (b) Give any two examples and explain transamination reactions. (06)

Q6 (a) Explain the regulation of purine nucleotide biosynthesis. (06)

(b) Write the reactions involved in pyrimidine biosynthesis. (06)

OR

Q6 (b) Write the steps of de novo biosynthesis of purine nucleotides. (06)

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(2)