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SARDAR PATEL UNIVERSITY

M. Sc. Semester- I (Under CBCS) Examination – BIOCHEMISTRY

Friday, 24th April 2015

Time- 10:30am to 1:30pm

PS01CBIC03 Cellular Metabolism

Marks: 70

Q.1 **Select the most correct answer from the following:** **[08]**

1. Which of the following molecule oxidizes most rapidly in a cell?
   a. Carbohydrate **c.** Protein
   b. Lipid **d.** DNA

2. Which of the following enzymes in glycolysis catalyzes a reaction that is essentially irreversible?
   a. Enolase **c.** Triose phosphate isomerase
   b. Phosphofructokinase **d.** Phosphohexose isomerase

3. During prolonged fasting conditions, which enzyme of glycolysis is inhibited by free fatty acids?
   a. Glucokinase **c.** Fructose 1,6,bisphosphatase
   b. Pyruvate kinase **d.** Phosphofructokinase

4. Which of the following fatty acids cannot be synthesized in mammals?
   a. α – linolenic acid **c.** Oleic acid
   b. Linoleic acid **d.** Both (a) and (b)

5. Chorismate is a key intermediate in the synthesis of-
   a. isoleucine, tyrosine, phenylalanine **c.** tryptophan, tyrosine, phenylalanine
   b. leucine, isoleucine, tyrosine **d.** phenylalanine, tyrosine, leucine

6. The first step in nitrogen cycle is-
   a. Hydrolysis of atmospheric nitrogen **c.** Oxidation of atmospheric nitrogen
   b. Reduction of atmospheric nitrogen **d.** None of the above

7. Purine nucleotide biosynthesis is regulated by-
   a. ATP, IMP, GMP **c.** AMP, GMP, IMP
   b. AMP, CMP, GMP **d.** AMP, TMP, CMP

8. Alkaptonuria is a disorder due to deficiency of enzyme-
   a. Homogentisate oxidase **c.** Phenylalanine 4 monooxygenase
   b. Tyrosine 3 monooxygenase **d.** Dihydroorotase

Q.2 **Answer the following questions. (ANY SEVEN OUT OF NINE)** [14]

1. Enlist all essential amino acids.
2. Differentiate between hexokinase and glucokinase.
3. What are anaploretic reactions? Give examples.
4. What are inhibitors and uncouplers? Give examples.
5. Name any four unsaturated fatty acids.
6. Distinguish between De-Novo and salvage pathway.
7. Why is gluconeogenesis expensive?
8. Explain: The free energy change for ATP hydrolysis is large and negative.
9. Differentiate between glucogenic and ketogenic amino acids.

Q.3 **a.** Explain the reactions involved in Q-cycle. [06]

b. Describe the chemiosmotic model when proton gradient transformed into ATP. [06]

OR

b. Explain the structure, function and mechanism of ATP synthase. [06]

Q.4 **a.** Explain the various fate of Glucose-6-phosphate in a cell. [06]

b. Describe the coordinated regulation of Glycolysis and Gluconeogenesis. [06]

OR

b. Explain the role of TCA cycle in intermediary metabolism. [06]

Q.5 **a.** How do AcetylCoA produced in mitochondria come to cytosol for fatty acid biosynthesis? [06]

b. Explain the oxidation of Palmitoyl -CoA with its energy production by β-oxidation. [06]

OR

b. Explain the regulation of fatty acid biosynthesis. [06]

Q.6 **a.** Explain transanimation reactions in detail. [06]

b. Write the steps for De-Novo synthesis of pyrimidine nucleotide. [06]

OR

b. Write the biosynthesis of chorismate and explain the biosynthesis of essential amino acids from the chorismate. [06]

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