

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Principles of Biochemistry

Subject Code: 5SC01PBC1

Branch: M.Sc. (Microbiology)

Semester: 1

Date: 28/11/2018

Time: 02:30 To 05:30

Marks: 70

Instructions:

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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SECTION – I

Q-1 Attempt the following questions (07)

- a. Define anabolism
- b. Write MM equation
- c. Name the drug which inhibits cholesterol biosynthesis
- d. How many ATP are gained when glucose breaks to lactate?
- e. Name any two unsaturated fatty acids
- f. What is second law of thermodynamics?
- g. Mention the components of a nucleotide

Q-2 Attempt all questions (14)

- a) Discuss the organization and functions of a typical cell membrane. (7)
- b) Lateral movement of proteins is possible in Biomembrane. Discuss any two techniques to prove it. (4)
- c) Differentiate between apoenzyme and holoenzyme (3)

OR

Q-2 Attempt all questions (14)

- a) Calculate the standard free-energy change of the reaction catalyzed by the enzyme phosphoglucomutase (7)
Glucose 1-phosphate \leftrightarrow glucose 6-phosphate
given that, starting with 20 mM glucose 1-phosphate and no glucose 6-phosphate, the final equilibrium mixture at 25°C and pH 7.0 contains 1.0 mM glucose 1-phosphate and 19 mM glucose 6-phosphate. Does the reaction in the direction of glucose 6-phosphate formation proceed with a loss or a gain of free energy?
- b) Explain the effect of pH and temperature on enzyme activity (4)
- c) Describe the functions of Vitamin A and its role in vision. (3)

Q-3 Attempt all questions (14)

- a) Compare Lineweaver-Burk plot for competitive inhibition and uncompetitive inhibition. (7)



- b) Discuss the spontaneity of a biochemical reaction at different temperature. (4)
- c) What is the cost in ATP equivalents of transforming glucose to Pyruvate via glycolysis and back again to glucose via gluconeogenesis? (3)

OR

- Q-3**
- a) Enzymes lower the activation energy for a reaction. Explain with the help of a graph. Also compare Lock & Key Model and Induced fit model. (7)
 - b) Describe the secondary structure of proteins (4)
 - c) What is transamination? Give an example? (3)

SECTION – II

- Q-4** **Attempt the Following questions** (07)
- a. Define reverse transcription
 - b. What is the terminal electron acceptor in mitochondrial ETC?
 - c. Name the termination codons
 - d. Name any two inhibitors of translation
 - e. Give the function of carnitine
 - f. What is wobble hypothesis?
 - g. Define Gibbs free energy

- Q-5** **Attempt all questions** (14)
- a) Describe the irreversible reactions in gluconeogenesis and glycolysis. Also mention the ATP-generating and ATP-consuming reactions and the substrate level phosphorylation reaction in glycolysis. (7)
 - b) Explain the features and energetic of β -oxidation of fatty acids (4)
 - c) What is PKU? Discuss the metabolic defect involved in it. (3)

OR

- Q-5**
- a) Discuss the regulation of glycogen synthesis (7)
 - b) DNA replication occurs by semi-conservative mode. Discuss (4)
 - c) Differentiate between DNA and RNA (3)

- Q-6** **Attempt all questions** (14)
- a) Discuss the elongation stage of translation in prokaryotes in detail. (7)
 - b) Differentiate between DNA Polymerase I, II and III (4)
 - c) Give the reaction catalyzed by the pyruvate dehydrogenase complex. List the enzymes and cofactors for pyruvate dehydrogenase complex. (3)

OR

- Q-6** **Attempt all Questions**
- a) Discuss the regulation of cholesterol biosynthesis. Name the steroid hormones synthesized from cholesterol catabolism. (7)
 - b) Describe in detail the model of DNA proposed by Watson and Crick (4)
 - c) Discuss the role of various initiation factors in eukaryotic transcription (3)

