PG Odd Semester (CBCS) Exam., December—2017

BIOTECHNOLOGY

(1st Semester)

Course No. : BTYCC–101

(Biological Chemistry)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. *(a)* Differentiate between the following citing examples : 3+3=6

(i) Essential and Non-essential amino acids

(ii) Purines and Pyrimidines

(b) Give the chemical reactions of glucose in acetylation and glycoside formation. 4+4=8

OR

2. *(a)* Give the structures of the following biomolecules : 2×4=8

(i) D-glucose

(ii) Pyruvate

(iii) Alanine

(iv) Sucrose

(b) Give the higher orders of protein structure and discuss about them in brief. 6

3. *(a)* Define *(i)* epimerism and *(ii)* redox potential. 2+2=4

(b) How does ATP act as the energy currency of the body? Give examples. 7

(c) State the second law of thermodynamics. 3

OR

4. *(a)* Explain the physiological steady state and work done by a biological system based on the principle of thermodynamics. 5

(b) In the reaction

Fructose 6-phosphate Glucose 6-phosphate
(K_{eq} 1 97)

(i) Find the G for the reaction at 25 °C.

(ii) If the concentrations of fructose 6-phosphate and glucose 6-phosphate are adjusted to 1·5 *M* and 0·5 *M* respectively, what is *G*?

(iii) Why are *G* and *G* different? 3+3+3=9

5. *(a)* State the hyperbolic saturation kinetics of enzyme action. 5

(b) Differentiate between K_m and V_{max}. Explain their significances. 2+2+1=5

(c) How does the Lineweaver-Burk double-reciprocal plot vary in competitive inhibition? 4

OR

6. *(a)* Define the following : 2×4=8

(i) Activation energy

(ii) Non-competitive inhibition

(iii) Enzyme-substrate complexes

(iv) Allosteric enzymes

(b) Determine the K_m of an enzyme-catalyzed reaction when V_{max} is twice V_0 and the initial [*S*] is 10 mM. 6

7. *(a)* Briefly state the role of transaldolases and transketolases in the synthesis of pentoses. 5

(b) Chalk out the steps of Krebs' cycle. 5

(c) Differentiate between substrate level phosphorylation and oxidative phosphorylation. 4

OR

8. *(a)* How does reversible covalent modification regulate glycogen metabolism? 4

(b) Give the steps of the mitochondrial respiratory chain explaining why it is called a coupled process. 8

(c) What is the final product of -oxidation? 2

9. Write short notes on the following : 7×2=14

(i) HPLC

(ii) UV-vis spectrophotometry

OR

10. Give brief accounts of *(a)* isolectric focussing and *(b)* fluorescence spectroscopy. 7+7=14

★ ★ ★