PG Odd Semester (CBCS) Exam., December—2016

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)* What is the advantage of storing glucose as starch or glycogen in a cell? 2

(b) Give the roles of vitamins and minerals. 4

(c) Differentiate between the following by giving an example of each with their chemical structures : 2×4=8

(i) Purines and pyrimidines

(ii) Saturated and unsaturated fatty acids

(iii) Aromatic and non-aromatic amino acids

(iv) Aldoses and ketoses

OR

2. *(a)* Chalk out the steps of cholesterol biosynthesis. 8

(b) Differentiate between bile salts and bile acids. Give examples. 4

(c) State the bonds stabilizing the quaternary structure of a multimeric protein. 2

3. *(a)* State with examples the basic reactions in a living system in view of the following : 2×3=6

(i) Redox reaction

(ii) Substitution

(iii) Molecular rearrangement

(b) Define the following : 2×3=6

(i) Mutarotation

(ii) Pyranose-furanose isomerism

(iii) Anomerism

(c) Explain the meaning of chiral centre with an example. 2

OR

4. *(a)* Define the following : 1×3=3

(i) Gibbs free energy

(ii) Enthalpy

(iii) Entropy

(b) "The living system does not violate the second law of thermodynamics." Justify the statement. 6

(c) State how redox reactions sustain chemical reactions in a cell giving an example. 5

5. *(a)* Define the following : 1×2=2

(i) K_{m}

(ii) V_{max}

(b) Write short notes on the following : 3×2=6

(i) Transition state theory

(ii) Enzyme-substrate complex

(c) State the Michaelis-Menten equation discussing the effect of substrate concentration on enzyme action. 6

OR

6. *(a)* What is Lineweaver-Burke double reciprocal plot? 3

(b) How does the L-B plot vary in cases of competitive, non-competitive and uncompetitive inhibitions? 6

(c) Write a brief account on allosteric enzymes. 5

7. *(a)* Chalk out the steps of glycolysis and briefly discuss its hormonal regulation. 6

(b) What is the energy yield from glycolysis under anaerobic and aerobic conditions? 4

(c) Why is gluconeogenesis not a reversal of glycolysis? 4

OR

8. *(a)* Chalk out the steps of *(i)* urea cycle and *(ii)* glyoxylate pathway. 3×2=6

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

(c) How do TCA cycle and the mitochondrial electron transport chain act as the final common pathway of metabolism? 4

9. *(a)* Write short notes on the following : 3×2=6

(i) Isoelectric focussing

(ii) TLC

(b) Discuss the use of radioisotopes for diagnostic purposes. 6

(c) State Beer-Lambert law. 2

OR

10. *(a)* Give the principle and applications of fluorescence spectroscopy. 4

(b) Differentiate between native PAGE and SDS-PAGE. 6

(c) Write a brief note on 2-D electrophoresis. 4

★ ★ ★