2018/ODD/09/28/BTY–101/029

PG Odd Semester (CBCS) Exam., December—2018

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)* Elucidate the structure of the following with suitable diagrams : 2×5=10

(i) Adenine

(ii) Ribose

(iii) Sucrose

(iv) Glutamine

(v) Oleic acid

(b) What are bile acids? State their functions and describe their structures. 1+1½+1½=4

OR

2. *(a)* Discuss the mechanism of cholesterol biosynthesis. 7

(b) Write a note on the different levels of structural organization of proteins. 7

3. *(a)* Differentiate between enantiomers and diastereomers. 2+2=4

(b) Give the structures of glucose and galactose. What is the class of stereoisomers to which they belong? 2+2+2=6

(c) What is a substitution reaction? 4

OR

4. *(a)* Discuss the significance of oxidation and reduction in a biological system. 7

(b) Define the following terms : 1+1+1=3

(i) Enthalpy

(ii) Entropy

(iii) Gibbs' free energy

(c) Discuss the importance of thermodynamics for a living system. 4

5. *(a)* State the Michaelis-Menten equation discussing the effect of molar concentration of substrate on enzyme action. 8

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

(i) Enzyme-substrate complex

(ii) Significance of K_{m}

OR

6. *(a)* Show the variations of the Lineweaver-Burke double reciprocal plot in competitive, non-competitive and uncompetitive inhibition of enzymes. 9

(b) What is allosteric modulation? 5

7. *(a)* How is glucose anaerobically metabolized to pyruvate? Give its regulation. 5+1=6

(b) Write brief accounts on the following : 3+3=6

(i) -oxidation

(ii) Urea cycle

(c) Why is gluconeogenesis not a reversal of glycolysis? 2

OR

8. *(a)* Chalk out the steps of mitochondrial electron transport chain mentioning how it is coupled to oxidative phosphorylation. 8

(b) Give a schematic account of ATP production from glycolysis, TCA cycle and mitochondrial respiratory chain. 3

(c) Differentiate between substrate level and oxidative phosphorylation. 3

9. *(a)* Define spectroscopy. Explain briefly the principle and applications of fluorescence spectroscopy in biological sciences. 4+8=12

(b) Write a brief note on Beer-Lambert law. 2

OR

10. Explain the principle and applications of the following : 7+7=14

(a) Isoelectric focussing

(b) SDS-PAGE

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