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Total number of printed pages – 2

B. Tech
CPBT 7201/PCBT 4201(O/N)

Third Semester Examination – 2010

BIOCHEMISTRY (Old and New Course)

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 × 10
- (a) Write down the structure of amino acids. How it promotes peptide bond formation ?
- (b) What is melting temperature ? Name the parameters which affect the melting temperature of DNA ?
- (c) Write down the significance of 'Ramachandran plot' ?
- (d) Define isoelectric point. Calculate the isoelectric point of Cysteine if pKa (α -COOH), pKa (α -NH₃⁺) and pKa R (side chain) values are 1.7, 10.8 and 8.3 respectively.
- (e) Why do differences in melting point exist between fatty acids containing same number of carbon atoms ?
- (f) What do you mean by activation energy? Why it is lowered in the catalyzed reactions ?
- (g) What are the different chemical bonds are present in a B-DNA molecule ?
- (h) What do you mean by zwitterions effect of an amino acid ?
- (i) The enzyme nucleoside diphosphate kinase catalyzes the following reversible reaction : GDP + ATP = GTP + ADP. Assuming the changes in

free energy on hydrolysis of ATP (to ADP and H_3PO_4) and GTP (to ADP and H_3PO_4) are equal, calculate the concentration of reactants and products at equilibrium, starting with 4mM GDP and 4mM ATP.

- (j) Write down the structure of adenine and its tautomeric form.
2. (a) Write down the structure of various form of carbohydrates with a note on their isomerism. 5
- (b) Briefly explain the carriers of Electron transport system involved in the oxidative phosphorylation of $FADH_2$ with a note on its ATP generation. 5
3. (a) Briefly explain the overall process of β -Oxidation of palmitic acid and add a comment on the energetics of this process. 6
- (b) Explain the methods used for the estimation of saponification value of lipid. What is its significance? 4
4. Explain the various level of organization of protein structure with emphasis on various bonds and chemical interaction on protein function. 10
5. Differentiate Between : 2.5×4
- (a) Gluconeogenesis and glycogenolysis
- (b) Nucleoproteins and Lipoproteins
- (c) Saturated and unsaturated fatty acid
- (d) B-DNA and Z-DNA
6. Briefly explain the process of glycolysis and TCA cycle showing oxidation of one glucose molecule and write down the energy balance sheet of the process. 10
7. Briefly explain the mechanisms of enzyme action with a note on enzyme kinetics at substrate inhibition. 10
8. Write short notes : 5×2
- (a) Chaperonin
- (b) Water soluble vitamins.