

2022

MICROBIOLOGY — HONOURS

Paper : CC-3

(Biochemistry)

[Unit-1 to Unit-6]

Full Marks : 50

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

Answer **question no. 1** and **any three** questions from the rest.

1. Answer **any ten** questions :

2×10

- (a) Define isoelectric point of a protein.
- (b) What do you mean by mutarotation?
- (c) Arrange the following molecules according to the presence of high energy bonds present in (i) ATP (ii) GDP and (iii) CMP (ascending order).
- (d) Define Saponification number.
- (e) How many peptide bonds are present in a tetrapeptide molecule? What are the characteristics of a peptide bond?
- (f) What is the value of  $V_{max}$  if  $V_o$  is equal to  $1\mu$  mol/min at  $1/10 K_M$ , for an enzyme that follows simple M-M kinetics?
- (g) What is 'Salting out' of a protein?
- (h) Define  $K_{cat}$ . What is its unit?
- (i) Define non-protein amino acid and give example.
- (j) What do you mean by isozymes? Give an example.
- (k) What are the components of secondary structure of proteins?
- (l) Calculate the axial length of an  $\alpha$ -helix containing 78 amino acids.
- (m) Define Gibb's Free energy.
- (n) Name the vitamin derived from cholesterol. Write its function.
- (o) What is peroxidation of lipid?

Please Turn Over

2. (a) What is antivitamin? Give an example. 2+½  
 (b) Write the structure of glutathione. What is its function? 1+1½  
 (c) Write the difference between proteoglycan and glycoprotein. 2  
 (d) What is Benedict's reagent? Mention its utility. 1+1  
 (e) Give one example of heteropolysaccharide. 1
3. (a) Define feedback inhibition with example. 2  
 (b) Compare homotropic allosteric inhibition and heterotropic allosteric inhibition. 2  
 (c) What fraction of  $V_{max}$  is observed at  $[S] = 4K_M$ ? Calculate the ratio of  $[S]_{0.9} / [S]_{0.5}$ . 2  
 (d) Explain the effect of pH on the activity of enzyme. 2  
 (e) Define activation energy of a reaction. 2
4. (a) Give one example for each of polar, non-polar amino acids and draw their structures. 1+1  
 (b) How does Sanger's reagent react with N-terminal amino acid of a protein? 2  
 (c) Which are the factors that stabilize the higher structure of protein? 3  
 (d) Differentiate between lock and key and induced fit model of enzyme substrate reaction. 3
5. (a) Why do *cis* fatty acids show lower melting point? 2  
 (b) What is rancidity? What are the causes of rancidity? 1+2  
 (c) How does soap remove dirt? Explain. 3  
 (d) What happens when linoleic acid is heated with iodine? 2
6. (a) What are the coenzyme forms of Vit B<sub>6</sub>? Briefly describe its function in enzyme catalysis.  
 (b) What are the roles of Biotin? Which molecule interferes biotin's function?  
 (c) State 2nd law of thermodynamics.  
 (d) Glucose, fructose and mannose form the same osazone product. Justify. (½+½+2)+(2+1)+2+2
7. Explain with proper reasons : 2½×4  
 (a) Inhibition is reversed by increasing the concentration of substrate for competitive inhibition but not for non-competitive inhibition.  
 (b) Protein and glycine is never found in α-helix.  
 (c) Lactose exist in two anomeric forms but sucrose have only one.  
 (d) High Density Lipoprotein (HDL) is good cholesterol and LDL is bad cholesterol.
-