[This question paper contains 4 printed pages.]

991 *Your Roll No.* .....

B.Sc. (Hons.) / II C

BIOCHEMISTRY – Paper VII

(Proteins, Enzymes and Co-enzymes)

(Admissions of 2000 and onwards)

Time : 3 *Hours* *Maximum Marks* : 60

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt **Five** *questions in all, including Q. No.* 1 *which is compulsory.*

1. (a) State whether true or false with justification :–

(i) All proteins are soluble in water.

(ii) Enzymes can be proteins, nucleic acids and polysaccharides.

(iii) Each protein has a unique isoelectric pH.

(iv) Enzymes bind substrates reversibly.

(v) Acid base catalysis is the only mechanism enzymes use.

P.T.O.

(vi) Km is a relative value dependant on a given enzyme and its substrate.

(vii) All enzymes are monomeric in nature.

(viii) Coenzymes are derived from small organic molecules.

(ix) Chymotrypsin has to be activated *in situ*.

(x) Enzymes differ from inorganic catalysts in being regulated. (1.5×10=15)

(b) Give one contribution of Prof. G. N. Ramachandran to protein chemistry. (1)

2. (a) Derive the Michaelis-Menten equation for monosubstrate reactions.

(b) What is the significance of Km and Vmax ?

(c) Why is the parameter Kcat/Km a measure of catalytic efficiency ? (4.5,2)

3. (a) Write the role of any one coenzyme you have studied indicating its structure, mechanism and vitamin precursor.

(b) Indicate with structure one anticancer drug which resembles a coenzyme and its mechanism of action.

(c) Pyruvate dehydrogenase complex has 5 coenzymes. name them. (5,3.5,2.5)

4. (a) Indicate the use of the following reagents in analysing proteins – Mercaptoethanol, CNBr, hydrazine, bromethylamine, FDNB.

(b) What are the various non-covalent and covalent bonds which contribute to protein 3-D structures ?

(c) Why are the enzymes trypsin and chymotrypsin used in the determination of primary structure of proteins ? (5,4.2)

5. (a) What is cooperativity among protein subunits ? Give two models proposed to explain the same.

(b) Aspartate transcarbamoylase is a well studied allosteric enzyme. Highlight its mechanism. (5,6)

6. (a) With examples write the various possible mechanisms for bisubstrate reactions.

(b) How can different bisubstrate reactions be differentiated ? (5,6)

7. (a) Draw the oxygen binding curves for Myoglobin and haemoglobin. Why is haemoglobin an oxygen transporter and myoglobin not ?

P.T.O.

(b) How is sickle celled anaemia caused ? (6.5)

8. Write short notes on any **two** :–

mechanism based inhibitors, mechanism of lysozyme action, role of metal ions in catalysis

(5.5×2=11)