# E 288

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2003.

Third Semester

Industrial BioTechnology

IB 232 — BIO-ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are supramolecules and polymolecular systems?

2. What are the molecular factors contributing the function of a receptor?

3. Define reversible and irreversible enzyme inhibitors.

4. What are catalytic antibodies?

5. What is the active site of a serine protease?

6. Give an example of a compound obtained by asymmetric synthesis.

7. Name two proteins that have copper ions.

8. How are micelles formed?

9. What are the three oxidation states of cobalt ion in the alkyl vitamin $B_{12}$?

10. What are the catalytic and stabilizing amino acids in the active sites of lysozymes?

PART B — (5 × 16 = 80 marks)

11. Compare and contrast the synthesis of a peptide using a chemical method and an enzymatic method.

12. (a) Describe the zigzag scheme of photosynthesis and elaborate any two models that study the artificial photosynthesis energy transfer.

Or

(b) How a mutation in the active site of an enzyme changes the activity of an enzyme? What is site-directed mutagenesis? How can this principle be used to prepare a better subtilisin enzyme?

13. (a) Explain hemoglobin structure and the role of iron in the oxygen transport. Explain Traylor models using his derivatives to elucidate the role of heme protein in the oxygen uptake and the steric hindrance in the CO uptake.

Or

(b) What are the various principles in the design of molecular clefts? Explain them with acridine derivatives. What are the properties of these designed molecules?

14. (a) Using Lipscomb's and Breslow's molecular models, enumerate the function of zinc(II) ion in the $\alpha$ -chymotrypsin.

Or

(b) Describe the different types of enzymes involved in the synthesis of chemicals.

15. (a) What is biomimetic-type synthesis? Explain the synthesis of specific isomers, and three, four, and five member rings using the biomimetic cyclization.

Or

(b) What are the three most frequently used crown ethers and their diameters in the synthesis of organic chemical? Describe the developments in the photoresponsive crown ethers membrane transport, pH modulation and metal extraction with suitable examples.

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