Biochemistry of Proteins 2.463 **Jan. 28, 2002**

Term Test-1

Answer all questions in the Exam Booklets. Put your name and student number on all exam booklets. You may use a calculator and diagrams where appropriate.

The total number of marks is 50, and you have 50 minutes to complete the exam, so spend about 1 minute per mark i.e. 20 min. for a 20 mark question etc.

Answer question 1. It is worth 6 marks.

1. Draw the chemical structure at pH 7 of one of the peptides that results from the treatment of the following peptide with trypsin:

   Tyr-Glu-Pro-Lys-Ser-Ala-Val

Answer question 2 or question 3. Each is worth 20 marks.

2. Outline a protocol for amino acid analysis of a protein and describe the reaction mechanism for peptide hydrolysis by strong acid or base. Explain how Ninhydrin is used to determine amino acid concentration.

3. Describe in chemical detail the reaction mechanism of the Edman degradation. Explain the role and importance of pH, buffers, and organic solvents in this process.

Answer questions 4 and 5. Each is worth 6 marks.

4. Briefly describe any three of the following:

   i. Electroendosmotic flow
   ii. Silanol derivitation
   iii. β-branched amino acid
   iv. Dimethylsulfoxide cleavage of peptides

5. Explain protein purification by Immobilized Metal Chelate Affinity Chromatography

Answer question 6. It is worth 12 marks.

6. Explain the chemical reactivity of the side-chain of the amino acid Cysteine and illustrate its usefulness with examples from amino acid analysis and protein folding.

Bonus Question worth 2 Marks

7. On the lumen side of the *trans* Golgi network is the active site of an integral membrane enzyme, the *tyrosyl protein sulfotransferase.* This enzyme carries out a post-translational modification of some proteins that pass through the Golgi. Draw the structure of a modified amino acid.