Biochemistry of Proteins 2.463 **Feb. 1, 2000**

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 questions 1. It is worth 6 marks.

1. Draw the chemical structure of the peptide Lys-Ala-Trp, at pH 7.

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

2. Describe in chemical detail the three main steps of the Edman degradation indicating the role and importance of pH, buffers, and organic solvents.

3. Outline a protocol for amino acid analysis of a protein and describe in chemical detail peptide hydrolysis by strong acid or base.

Answer questions 4. It is worth 12 marks.

4. Describe sedimentation velocity analysis of proteins making use of the following two equations. Be sure to explain the meanings of each of the terms in the equations.

$$\frac{dr}{dt} = \frac{M_r(1-\bar{v}\rho_o)\omega^2 r}{N \bullet f} \qquad D = RT/Nf$$

Answer question 5. It is worth 12 marks.

5. Explain the chemical reactivity of the amino acid Cys, give some examples, and describe the role of this chemistry in the folding of proteins.

Bonus Question: It is worth 2 marks.

6. The ribosomes of *E. coli* are large particles comprised of two smaller particles called the 30S and 50S subunits. The intact ribosome has a sedimentation coefficient of 70S. Explain.