Biochemistry of Proteins 2.463 Term Test-2 March 5, 2001

Answer all questions in the Exam Booklets. Put your name and student number on all exam booklets. You may use a calculator and <u>diagrams</u> 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. 15 min. for a 15 mark question etc.

Answer Question 1. It is worth 12 marks.

1. Explain in words what is a dihedral angle and give a definition of the angle ω . Draw the chemical structure of the peptide Met-Cys at pH 7 and label <u>all</u> the dihedral angles with Greek letters or names.

Answer Question 2 <u>OR</u> Question 3. Each is worth 15 marks.

1. Explain clearly the process by which a protein can be sequenced using mass spectrometry.

<u>OR</u>

1. Outline, in chemical detail, the solid-phase synthesis of a peptide. Describe the functions of the solid-phase support in peptide synthesis and comment on the advantages and disadvantages of solid phase and solution phase syntheses.

Answer Question 4. It is worth 12 marks.

1. Compare and contrast the structural features of the α -helix and the 310 helix. Be sure to define all the structural parameters you mention.

Answer Questions 5. It is worth 11 marks.

1. The Figure below shows the circular dichroism spectra of some proteins. Give a brief explanation of circular dichroism (CD) and then explain the use of CD spectra in protein analysis. Explain the differences between the CD spectra measured for the synthetic all D-amino acid and all L-amino acid HIV-1 proteases. What possible advantages might an organism have that can synthesize all proteins comprised of D-amino acids?