CHEM 4630 – Biochemistry of Proteins **March 07, 2007**

Term Test-2

Answer all questions in the Exam Booklets. Put your name and student number on all exam booklets. You may use a calculator. Use ***structures*** *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. 15 min. for a 15-mark question etc.

Answer question 1.

(8) 1a. Explain how electrospray ionization AND matrix-assisted laser desorption ionization methods insert proteins into the vacuum of the mass spectrometer.

Answer question 2.

(8) 2a. Outline the steps involved in the solid-phase synthesis of peptides. Molecular structures are required for full marks.

(4) 2b. Explain the origin of "Termination Peptides" and "Deletion Peptides" in solid-phase peptide synthesis.

Answer questions 3 OR 4.

(10) 3. Describe in detail an α-helix and a 3_{10} helix remarking on the differences between them.

(10) 4. Compare and contrast the structural features of the α-helix and β-sheet.

Answer question 5.

(12) 5. Explain what is circular dichroism spectropolarimetry and its use in the study of proteins. In your answer, use the following equation and be sure to explain the meanings of all the symbols.

$$[\varepsilon] = x\,[\varepsilon]_\alpha + y\,[\varepsilon]_\beta + z\,[\varepsilon]_t + r\,[\varepsilon]_i$$

Answer question 6

(8) 6. Explain in words what is a dihedral angle. Give a definition of the dihedral angle ϕ. Draw the peptide Gly-Ala and label all the dihedral angles with Greek letters or names. Draw and label a Ramachandran Diagram. What information does it convey?