CHEM 4630 – Biochemistry of Proteins

November 12, 2008

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 <u>structures</u> and <u>diagrams</u> where appropriate.

The total number of marks is 44 and you have 50 minutes to complete the exam, so spend about 1 minute per mark i.e. 10 min. for a 10-mark question etc.

Answer questions 1 AND 2 AND 3.

- (6) 1. Complex instrumentation is used to make highly accurate measurements of the masses of proteins. Name 6 applications where accurate mass determination provides important information about proteins
- (8) 2. What does the abbreviation SILAC stand for? Describe the SIALC proteomics approach, what it attempts to measure, and how it is carried out.
- (10) 3. Outline the steps involved in the solid-phase synthesis of peptides. Molecular structures are required for full marks. Be sure to show the structure of an activated amino acid. Explain the role and importance of the solid resin.

Answer questions 4 <u>OR</u> 5.

- (10) 4. Outline how the peptide Ac-r-f-w-i-n-k-NH₂ was obtained through combinatorial peptide synthesis. Explain the biological significance of the synthesis.
- (10) 5. Compare and contrast the structural features of the α -helix and β -sheet.

Answer questions 6 AND 7.

- (6) 6. Explain how X-ray diffraction and molecular dynamics simulations revealed how O_2 can gain access to the heme iron that is buried in the hydrophobic core of myoglobin.
- (4) 7. Draw a helical wheel for the following sequence. What does the diagram reveal? Ile-Asn-Glu-Ala-Phe-Asp-Leu-Leu-Arg-Ser-Ala