CHEM 4630 – Biochemistry of Proteins

March 18, 2014

Term Test-2

Answer all questions in the Exam Booklets. Put your name and student number on all exam booklets. Draw <u>structures</u> and <u>diagrams</u> where appropriate.

The total number of marks is 54 and you have 75 minutes to complete the exam.

Answer ALL questions.

- (8) 1a. Give an <u>outline</u> of the steps involved in the solid-phase synthesis of peptides. Molecular structures are required for full marks. You must show the formation of a peptide bond but you need not show any other mechanisms such as amino acid activation.
- (2) 1b. Explain the term *racemization*. What important implication does it have for peptide synthesis?
- (4) 2. Explain the structural relationships between *D*-HIV Protease and *L*-HIV Protease.
- (6) 3a. Describe 3 parameters measured in NMR spectroscopy that are used for the determination of protein structures.
- (4) 3b. Briefly describe how protein structures are determined by NMR spectroscopy using the parameters you mentioned in 3a above. Describe the outcome of this process.
- (8) 4. Explain in words what is a dihedral angle. Give a definition of the dihedral angle ψ. Draw the structure of any dipeptide and label a dihedral angle ψ. Draw and label a Ramachandran Diagram. What information does it convey?
- (12) 5. Explain the packing of α -helices into coiled-coil structures. For best results use diagrams!

(10) 6. With the use of the following diagram describe the structure and function of neuraminidase.



Bonus Question

(1) 7. All proteins can exist in folded and unfolded states. Name another putative universal state of proteins.