CHEM 4630 – Biochemistry of Proteins **April 4, 2017**

Term Test-2

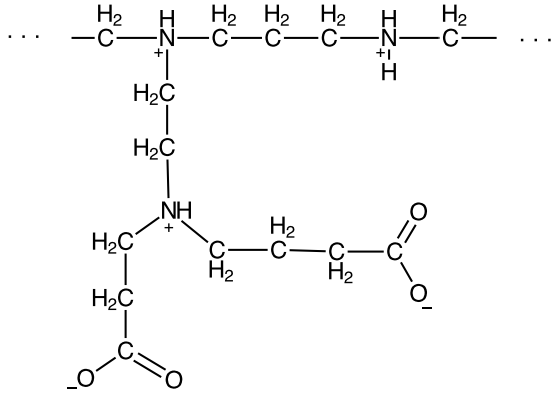
*Answer **all** the questions in the Exam Booklets. Put your name and student number on all exam booklets. Draw **structures** and **diagrams** where appropriate.*

The total number of marks is 52 and you have 75 minutes to complete the exam.

(8) 1. Outline the process of electrospray ionization of a protein.

(4) 2. A positive ion mode electrospray ionization mass spectrum of apocalmodulin showed a family of peaks. Two neighbouring peaks in the family had m/z values of 1,785.77 and 2,008.87. What is the mass of apocalmodulin? *For full marks show your calculations.*

(5) 3. Briefly explain the use of the following molecule.



(8) 4. Give an **outline** 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.

(4) 5. Explain the structural relationships between *D*-HIV Protease and *L*-HIV Protease.

(8) 6. Describe the process by which protein structures are determined by cryoelectron microscopy. What are some benefits of the method in comparison to X-ray diffraction.

(7) 7. Draw and label a Ramachandran diagram and indicate the location of the left- and right-handed α-helix, parallel and anti-parallel β-sheet, and the collagen triple helix = polyproline helix.

(8) 8. Describe the structure and functions of the polyproline helix.