

**Term Test-1**

*Answer all questions in the Exam Booklets. Put your name and student number on all exam booklets. You may use a calculator, and draw **structures** and **diagrams** where appropriate.*

*The total number of marks is 45, 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 6 marks.**

1. Draw the chemical structure at pH 7 of **one** of the peptides that results from the treatment of the following peptide with trypsin:  
Ser-Val-Asp-Lys-Leu-Tyr-Gly

**Answer question 2 OR question 3. Each is worth 15 marks.**

2. Describe in chemical detail the main steps of an Edman degradation indicating the role and importance of pH, buffers, and organic solvents.
3. Outline a protocol for amino acid analysis of a protein and describe in chemical detail peptide hydrolysis by strong acid. Explain the problem that arises in amino acid analysis when a protein contains  $\beta$ -branched dipeptides and present a solution to the problem.

**Answer questions 4 AND 5. Each is worth 6 marks.**

4. A 25 micromolar solution of a newly discovered protein, Cryin, has an absorption at 280 nm of 0.4125 and an absorption at 288 nm of 0.2793, in a cell of 1 cm path length. The extinction coefficients (in  $M^{-1} \cdot cm^{-1}$ ) for tyrosine and tryptophan at the two wavelengths are listed below. From the information given, calculate the number of Tyrosine and Tryptophan residues in Cryin. Show your work for full marks.

	$\epsilon_{280}$	$\epsilon_{288}$
Trp	5690	4815
Tyr	1280	385

5. Describe the advantages of High Performance Liquid Chromatography over open column conventional chromatography. Include a description of the chromatography beads.

**Answer question 6. It is worth 12 marks.**

6. Explain the principles behind the separation of molecules by Capillary Electrophoresis. What are the advantages of Capillary Electrophoresis compared to polyacrylamide gel electrophoresis? Are there any disadvantages?