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 58 and you have 75 minutes to complete the exam.

(8)   1.   With the use of the following table of amino acid masses deduce the sequence of the peptide that generates the following fragment ions in a tandem CID spectrum.

Ala	71	Arg	156	Asn	114
Asp	115	Cys	103	Glu	128
Gln	129	Gly	57	His	137
Ile	113	Leu	113	Lys	128
Met	131	Phe	147	Pro	97
Ser	87	Thr	101	Trp	186
Tyr	163	Val	99		

The mass of the parent ion is 468 Da. The fragment ions have masses of 295 Da, 158 Da and 59 Da. It may be helpful to know the masses of the atoms: H = 1 Da, C = 12 Da, N = 14 Da, O = 16 Da, S = 32 Da.

(2)   2.   Give a definition of proteomics.

(6)   3.   Describe a proteomics method for <u>quantifying</u> proteins in cells.

(12) 4.   Describe, in chemical detail using structures, the main steps of an Edman degradation indicating the role and importance of pH, buffers, and organic solvents.

(8)   5.   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)   6.   What is a deletion peptide? How can deletion peptides be reduced or eliminated?

(8)   7.   Explain how mirror-image phage display can be used to produce a drug. What is the motivation for this approach?

(6)   8.   Explain the meaning of "*Resolution*" and "*R-factor*" as they apply to the method of X-ray diffraction.

(4)   9.   Draw a peptide bond and its resonance structures. Explain why the peptide bond is planar.