Department of Biochemical Engineering and Biotechnology
BEL 420: Analytical Methods in Biotechnology
Major examination (II Semester 2008-2009)

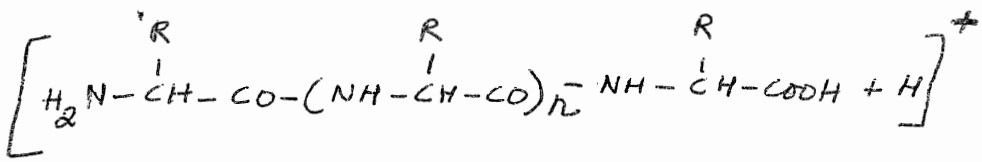
Time: 2 hours **Max Marks: 35**

Q.1 a. It is observed that during the process of ESI, the droplets at the mouth of the capillary while being spherical in the beginning come out as a Taylor cone eventually. Describe the factors affecting this process. 3

b. What are the advantages associated with carrying out ionization process at atmospheric pressure? Name an ionization source where this occurs. Also list down its disadvantages (if any). 2.

c. Under which conditions are positive and negative ions generated? 2

Q.2 a. Given below is a schematic representation of the peptide chain. Explain how the a, b and c series of ions can be generated? How can this information be used for determining the peptide sequence of proteins? 4



b. How can mass spectrometry be used in the drug development program ? 3

c. A globular protein aggregates to form both a dimer and a tetramer. What are the different ways by which you can resolve and analyze these? 3

Q.3 Describe the principle on which Geiger counting of radioactive materials is based. What is meant by dead time here? 3

Q.4. a If the processes of unfolding of proteins are too fast, how can you monitor the course of reactions using CD and or fluorescence techniques? Explain it with basic principle. 5

b. How can the structure-activity relationship of protein molecules can be established using emission and absorption spectroscopy together, along with the measurement of functional properties? Explain. 5

c. If a protein does not contain any natural fluorophore, is it possible to study it's conformational properties using fluorescence spectroscopy? Explain. 5