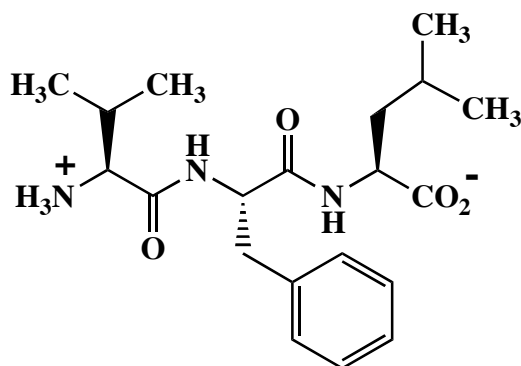


Problem Set 16

1. Define the term, "isoelectric point". Draw the structure of the α -amino acid, L-(+)-valine, at its isoelectric point. Draw a second diagram to show the structure of L-(+)-valine at very low pH. Finally, compare the overall charges of these two structures.

2. Define the terms, "primary structure", "secondary structure", and "tertiary structure" of proteins. Distinguish between these structural descriptors. Give specific examples to illustrate your answer.

3. Use the Merrifield solid-phase methodology to design a synthesis of the following tripeptide from the corresponding BOC-protected α -amino acids. Use any inorganic and organic reagents that are necessary. Show all reagents and stable synthetic intermediate compounds. (Note: Do not draw mechanisms for each synthetic transformation!)



4. An alternative amine protecting group is the carbobenzyloxy (Cbz or Z) group. It is prepared by the reaction of an amine with benzyl chloroformate. A specific example of its use is shown below. Draw the mechanism of this reaction, using the curved-arrow notation to indicate the reorganization of electron density. Denote **all** intermediates, lone pairs, nonzero formal charges, countercharges, and reversibility or nonreversibility.

