1. What is the structure of L-valine at its isoelectric point?

2. What is the structure of L-arginine at pH 7?

3. Draw L-Ala-L-Ala and compare it with D-Ala-D-Ala.

4. Draw Ala-Gly-Lys in the zig-zag form. Place the N-terminus at the left.

5. Why is the methyl glycoside of mannose not a reducing sugar? Provide the structure of one that is. Draw it in its pyranose form.

6. Formulate the reaction of Ileu-Gly with Edman’s reagent. Provide a reaction mechanism.

7. What is the product of trimerization of styrene under mild acid catalysis? Formulate a mechanism. [How does this problem relate to our discussion of the Merrifield synthesis of peptides?]

8, 9. Formulate a mechanism. Assume the existence of a proton source.

8. How does this problem relate to our study of carbohydrate chemistry?

9. Predict the product and formulate a mechanism to account for its formation. [How does this problem relate to our discussion of the prevention of cell wall production?]

10. What is the product of the reaction of sodium acetate and benzyl chloride? How does this question relate to our study of peptide synthesis?

11. Indicate the reagents needed to accomplish the following overall transformation.

11 [a] What amino acids make up the primary structure of the dipeptide generated above? Is it made up of natural or unnatural amino acids? How do you know?

11 [b] Indicate the reagents and reactions needed to sequence the dipeptide?
12. How would one sequence the following pentapeptide? Be specific. What are the component amino acids? Draw each as they would exist at a pH of 7.

13. Predict the product. How does this problem relate to our discussion of peptide synthesis? Formulate a mechanism for the transformation.

14. Indicate how the following transformation could be assisted by chymotrypsin. Provide mechanistic detail.

15. What is the structure and function of:
   [a] DCC?
   [b] a BOC-protected amine?
   [c] histidine in the action of a serine protease?