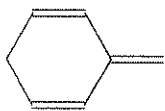
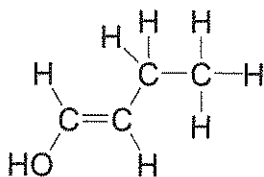


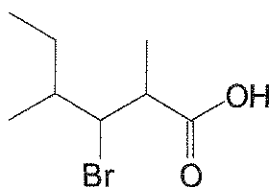
1. Convert the following structure from Line Bond Notation to a Lewis Structure. (4 pts)



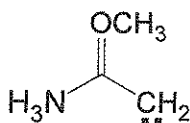
2. Convert the following Lewis Structure to Line Bond Notation. (4 pts)



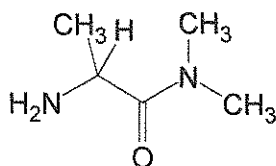
3. Give the official IUPAC name of the molecule shown below. (4 pts)



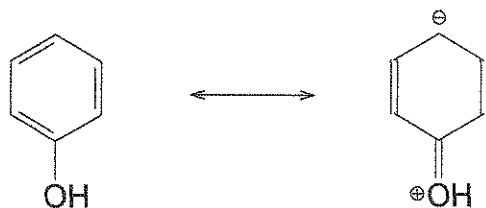
4. Fill in all missing non-zero formal charges on the molecule shown below. (4 pts)



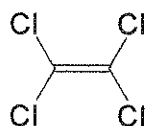
4. Draw a resonance structure for the molecule shown below. If your resonance structure has any formal charges, be sure to show them clearly. (4 pts)



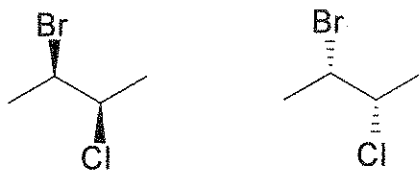
6. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would convert to the structure on the right and how the structure on the right would convert to the structure to the left. (4 pts)



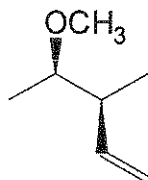
7. Draw the structure of the polymer that would form upon polymerization of the following alkene with itself. (4 pts)



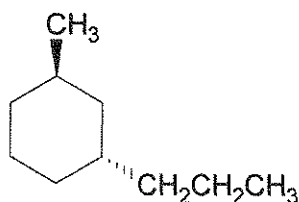
8. What is the relationship between the following two molecules? Are they identical, enantiomers or diastereomers? (2 pts)



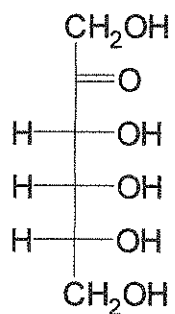
9. Determine the R/S configuration of each chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon. (4 pts)



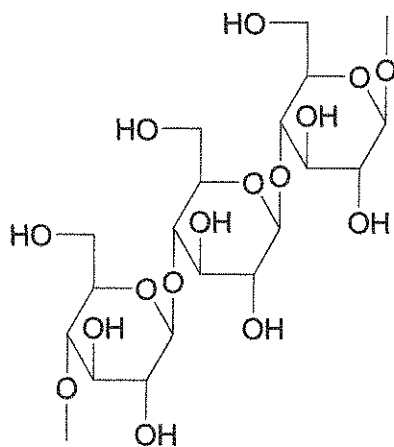
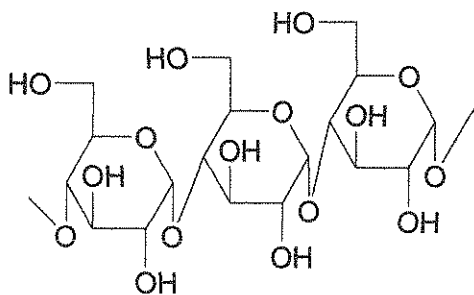
10. Draw both chair conformations of the following cyclohexane compound and circle the one that is lower in energy. (8 pts)



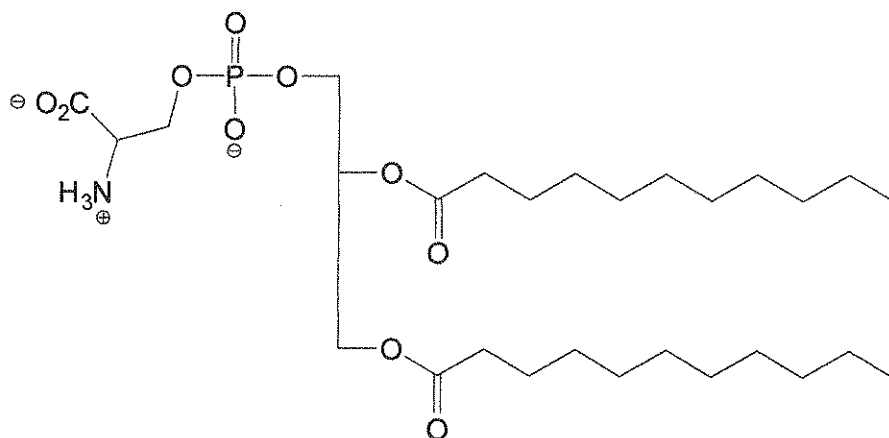
11. Convert the following sugar to its ring/hemiacetal form. Draw a *five* membered ring. Draw the anomeric OH group in a beta (β) position. (6 pts)



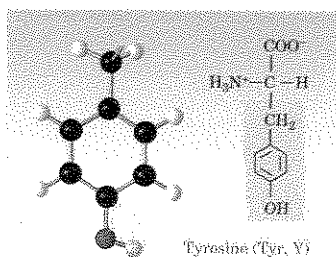
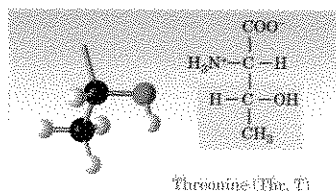
12. What is the structural difference between these two polymeric forms of glucose? (4 pts)



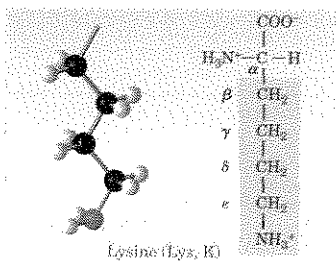
13. The following diagram depicts a phospholipid. (4 pts)
- Identify and circle each of the following components: phosphate, amino acid, fatty acid.
 - Label the hydrophilic end of the phospholipid.
 - Label the non-polar end of the phospholipid.
 - Which end of the phospholipid faces an aqueous environment?



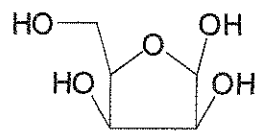
14. Construct a tripeptide THR TYR LSY from the amino acids shown below. Make sure to draw it in the form it would take in your body (at physiological pH). (8 pts)



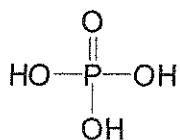
(d) Basic



15. Given the structures below, draw ribose 5-phosphate (4 pts):

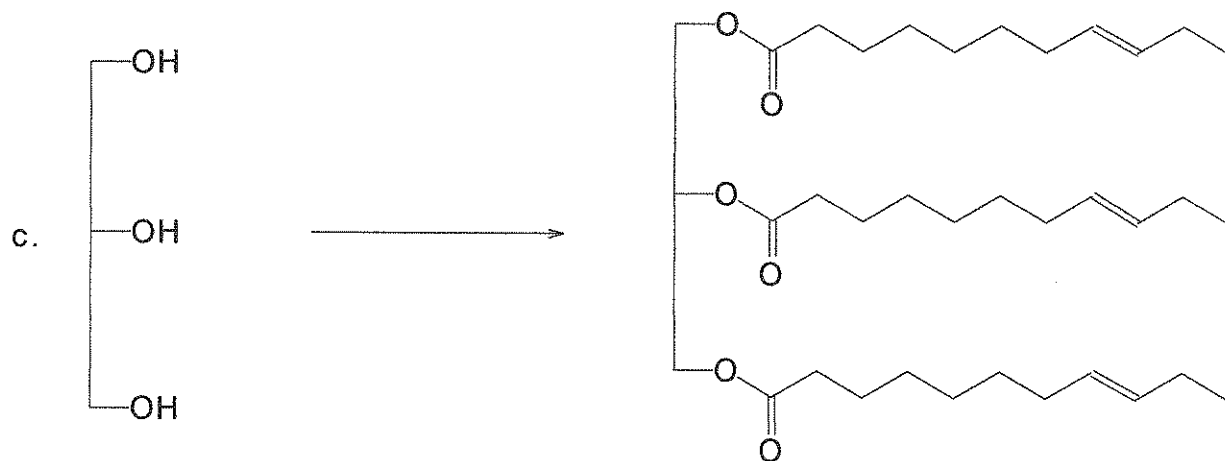
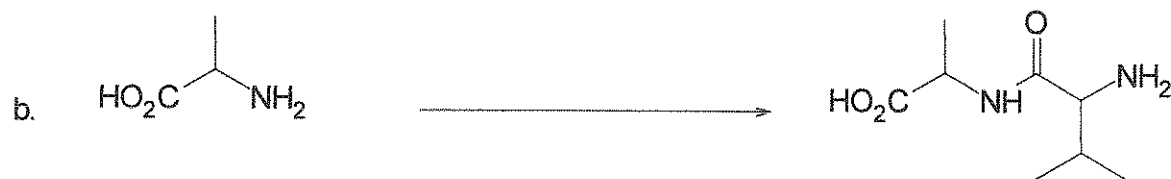
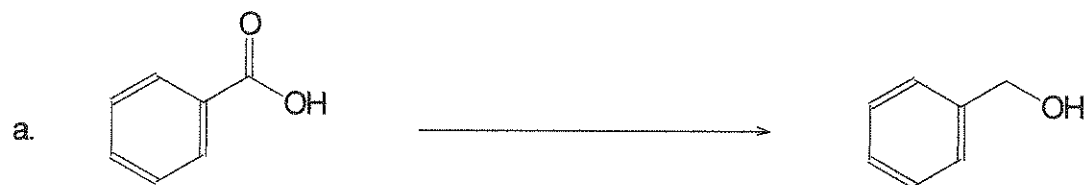


ribose

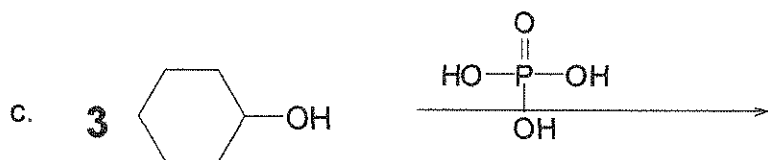


phosphoric acid

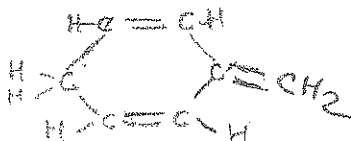
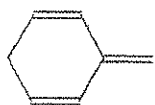
16. Fill in the missing reagent(s) needed to accomplish each of the following reactions. (12 pts)



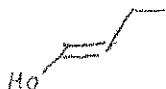
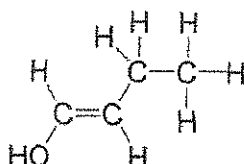
17. Give the product of each of the following reactions. (20 pts)



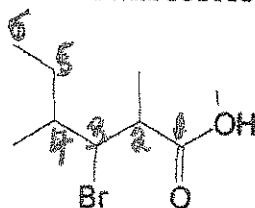
1. Convert the following structure from Line Bond Notation to a Lewis Structure. (4 pts)



2. Convert the following Lewis Structure to Line Bond Notation. (4 pts)

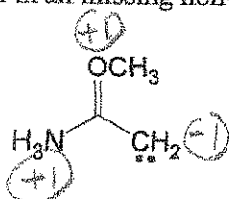


3. Give the official IUPAC name of the molecule shown below. (4 pts)

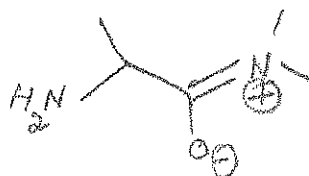
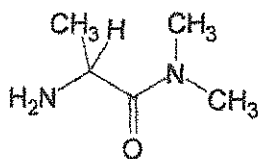


2,4-dimethyl-3-bromo hexanoic acid

4. Fill in all missing non-zero formal charges on the molecule shown below. (4 pts)



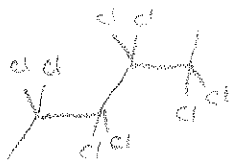
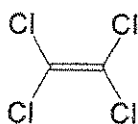
4. Draw a resonance structure for the molecule shown below. If your resonance structure has any formal charges, be sure to show them clearly. (4 pts)



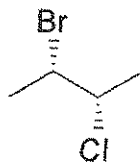
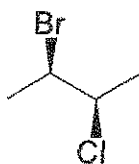
6. Two resonance forms of the same molecule are shown below. Draw arrows to show how the structure on the left would covert to the structure on the right and how the structure on the right would covert to the structure to the left. (4 pts)



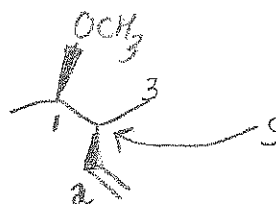
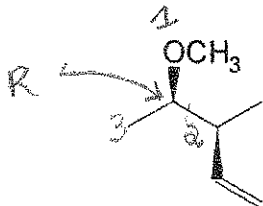
7. Draw the structure of the polymer that would form upon polymerization of the following alkene with itself. (4 pts)



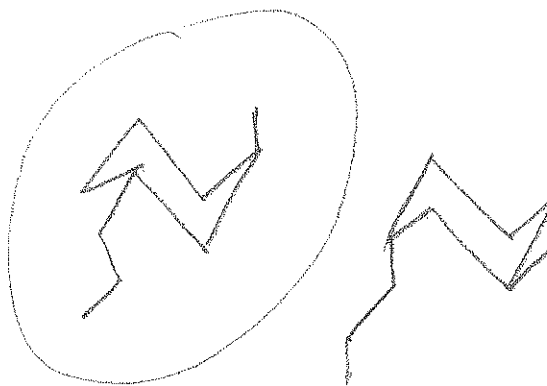
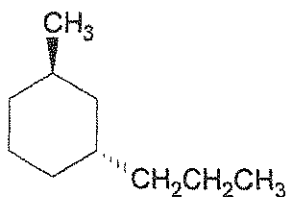
8. What is the relationship between the following two molecules? Are they identical, enantiomers or diastereomers? (2 pts)



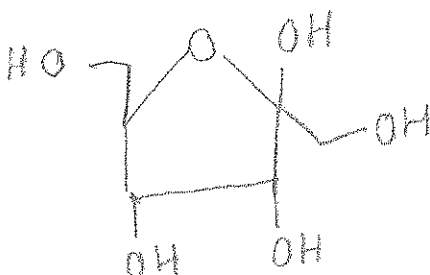
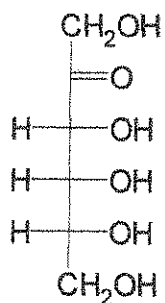
9. Determine the R/S configuration of each chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon. (4 pts)



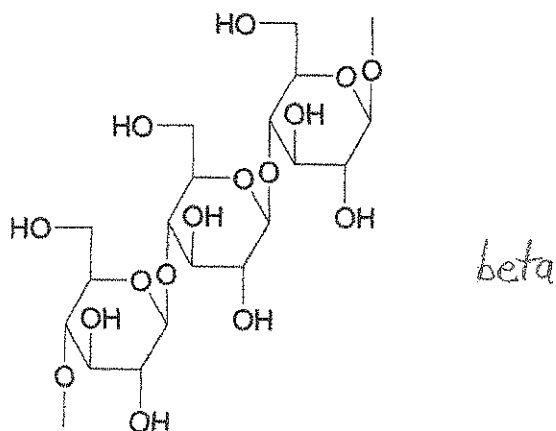
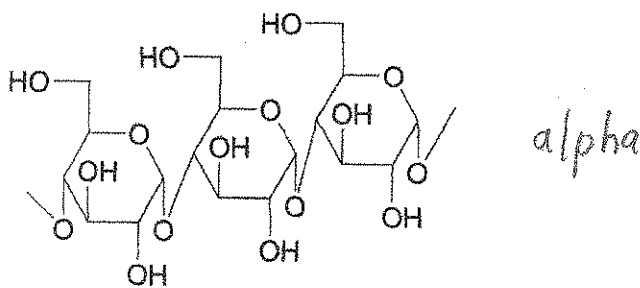
10. Draw both chair conformations of the following cyclohexane compound and circle the one that is lower in energy. (8 pts)



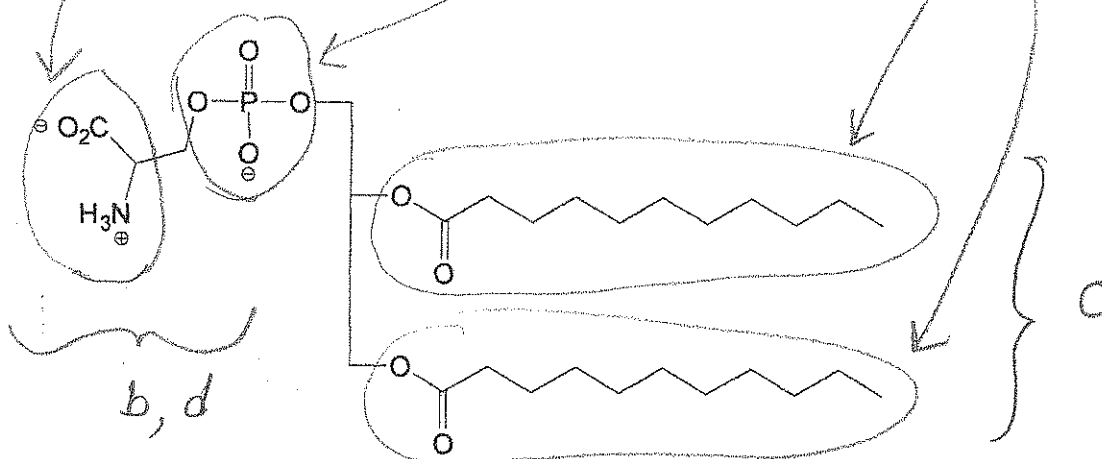
11. Convert the following sugar to its ring/hemiacetal form. Draw a *five* membered ring. Draw the anomeric OH group in a beta (β) position. (6 pts)



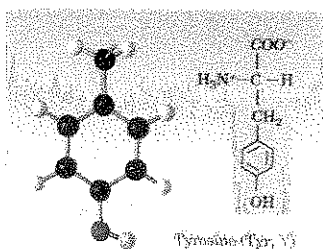
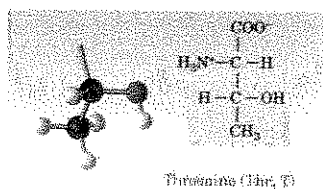
12. What is the structural difference between these two polymeric forms of glucose? (4 pts)



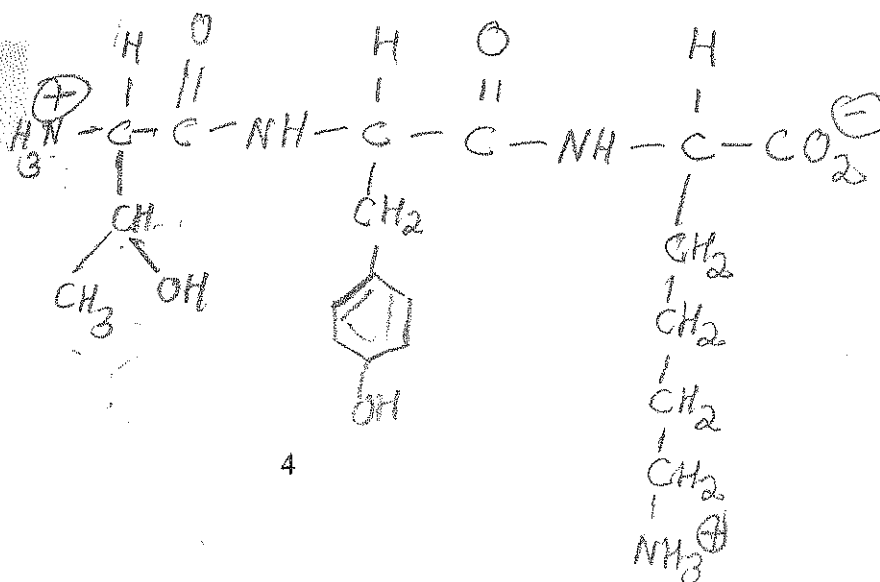
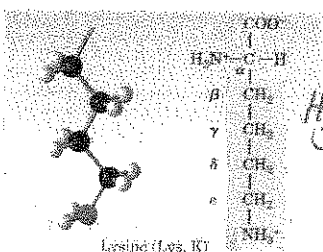
13. The following diagram depicts a phospholipid. (4 pts)
- Identify and circle each of the following components: phosphate, amino acid, fatty acid.
 - Label the hydrophilic end of the phospholipid.
 - Label the non-polar end of the phospholipid.
 - Which end of the phospholipid faces an aqueous environment?



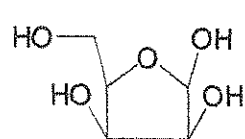
14. Construct a tripeptide THR TYR LSY from the amino acids shown below. Make sure to draw it in the form it would take in your body (at physiological pH). (8 pts)



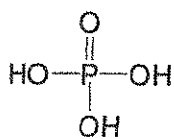
(d) Basic



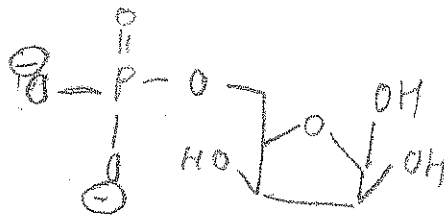
15. Given the structures below, draw ribose 5-phosphate (4 pts):



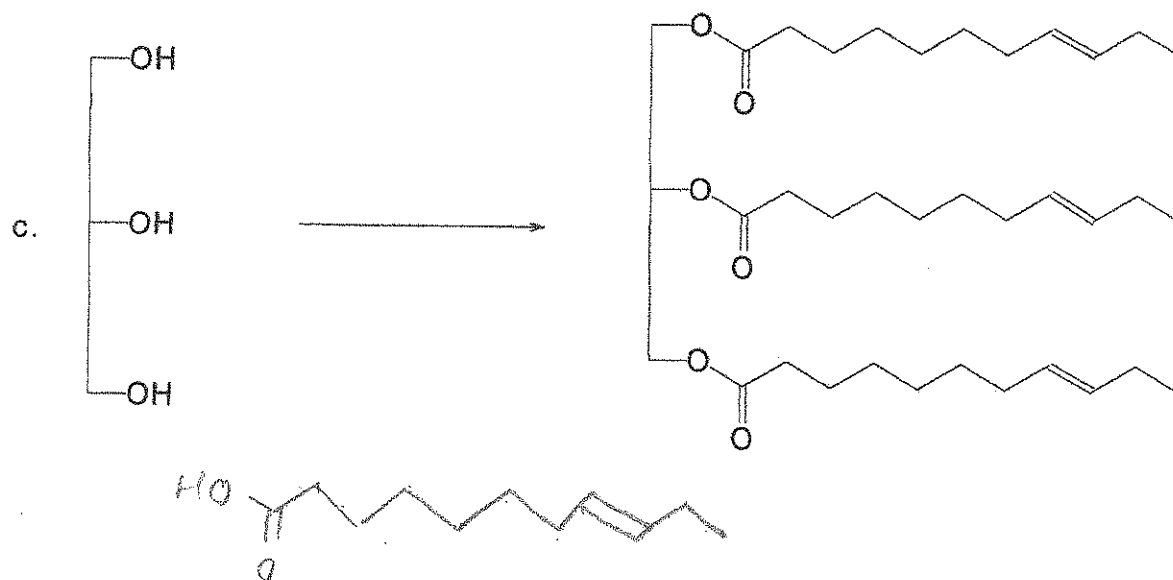
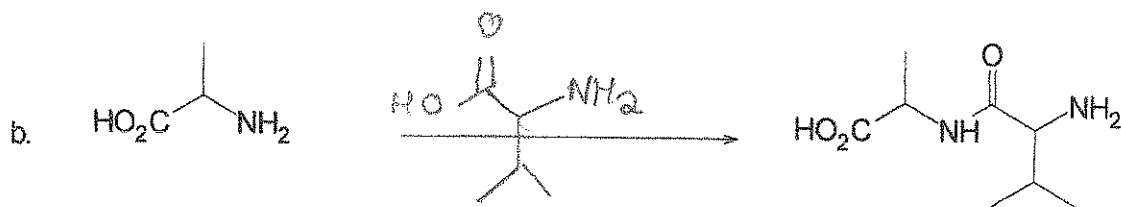
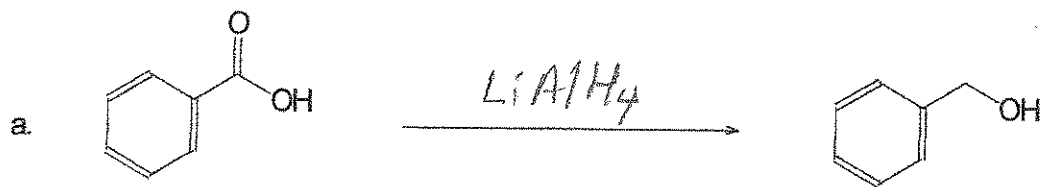
ribose



phosphoric acid



16. Fill in the missing reagent(s) needed to accomplish each of the following reactions. (12 pts)



17. Give the product of each of the following reactions. (20 pts)

