

Answer the following questions (10 points/each question):

1. Give a scheme of synthesis of benzaldehyde to 5,5-diphenylhydantoin.
2. Give an example of the Mannich reaction.
3. Give 3 electron-withdrawn functional group and 3 electron-donating group of benzene ring.
4. Give 3 methods of resolving optical isomers.
5. Explain the order of basicity ;
dimethylamine>methylamine> trimethylamine> ammonia.
6. Describe a synthesis scheme from nitrobenzene to p-nitrotoluene.
7. How to distinguish primary, secondary, and tertiary alcohol by chemical reaction or spectroscopy?
8. Describe the mechanisms of hydrolysis of an ester in acidic and basic solution.
9. Define "hyperconjugation" of electrons.
10. Describe a synthesis scheme from amino acids to phe-glu-lys tripeptide.