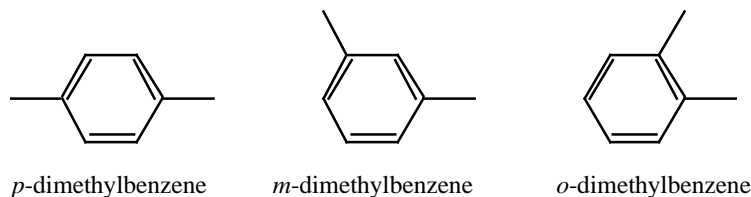
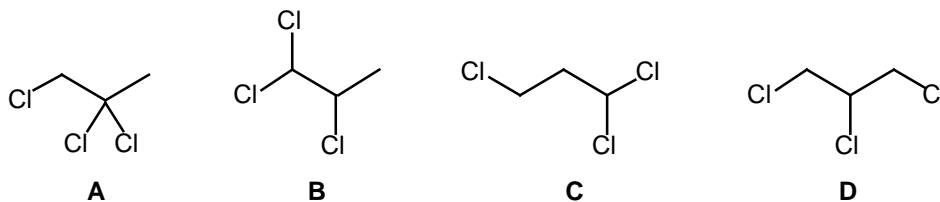


Problem Set #7
CH241-2001F

- [1] How would you tell the following three isomers apart by ^{13}C NMR spectroscopy and IR spectroscopy? [The prefix *ortho*-, *meta*-, and *para*- refer to the 1,2-, 1,3-, and 1,4-substitution pattern on the benzene ring.]



- [2] Using off-resonance decoupled ^{13}C NMR spectra, how would you distinguish the isomeric compounds shown below?



- [3] Suggest an efficient synthesis of the nitrile **A** from the bromide **B**.



- [4] When optically active 1-bromo-3-ethylcyclopentane was treated with potassium *tert*-butoxide in *tert*-butanol, two isomeric products were obtained.

- (a) Propose structures for these two products.
(b) Are these products optically active? Explain.

- [5] Consider the conversion of an alkyl chloride (R-L) to the alkyl bromide (R-Br) with NaBr. If the reaction has proceeded to 75% completion at equilibrium, what is the equilibrium constant K for this reaction?