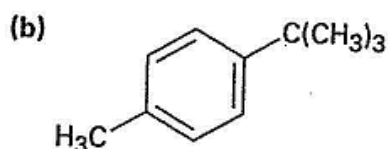
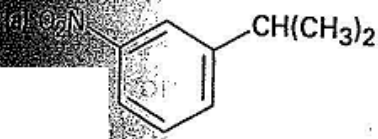


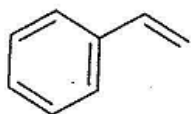
Problem 16.18

What aromatic products would you obtain from the KMnO_4 oxidation of the following substances?



Problem 16.20

Styrene, the simplest alkenylbenzene, is prepared commercially for use in plastics manufacture by catalytic dehydrogenation of ethylbenzene. How might you prepare styrene from benzene using reactions you've studied?



Styrene

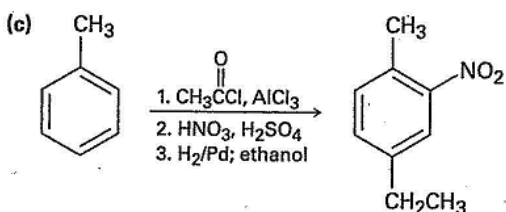
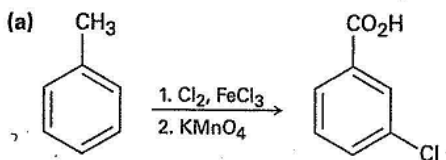
Problem 16.47

Starting with either benzene or toluene, how would you synthesize the following substances? Assume that ortho and para isomers can be separated.

- (a) 2-Bromo-4-nitrotoluene (b) 1,3,5-Trinitrobenzene
 (c) 2,4,6-Tribromoaniline (d) *m*-Fluorobenzoic acid

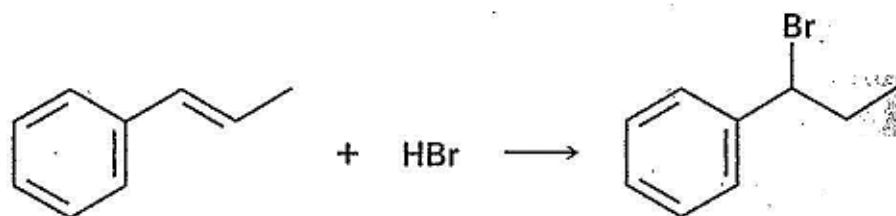
Problem 16.48

As written, the following syntheses have flaws. What is wrong with each?

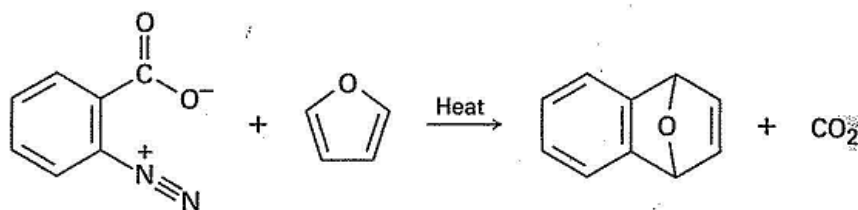


Problem 16.51

Addition of HBr to 1-phenylpropene yields only (1-bromopropyl)benzene. Propose a mechanism for the reaction, and explain why none of the other regioisomer is produced.

**Problem 16.58**

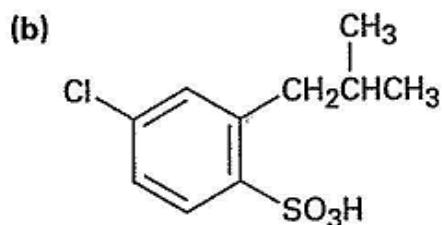
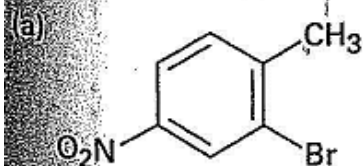
Benzenediazonium carboxylate decomposes when heated to yield N_2 and a reactive substance that can't be isolated. When benzenediazonium carboxylate is heated in the presence of furan, the following reaction is observed.



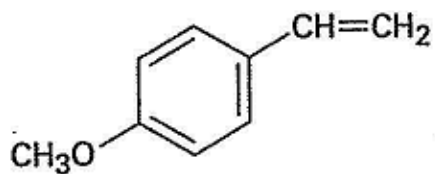
What intermediate is involved in this reaction? Propose a mechanism for its formation.

Problem 16.68

How would you synthesize the following compounds from benzene? Assume that ortho and para isomers can be separated.

**Problem 16.69**

You know the mechanism of HBr addition to alkenes, and you know the effect of various substituent groups on aromatic substitution. Use this knowledge to predict which of the following two alkenes reacts faster with HBr. Explain your answer by drawing resonance structures of the carbocation intermediates.



and

