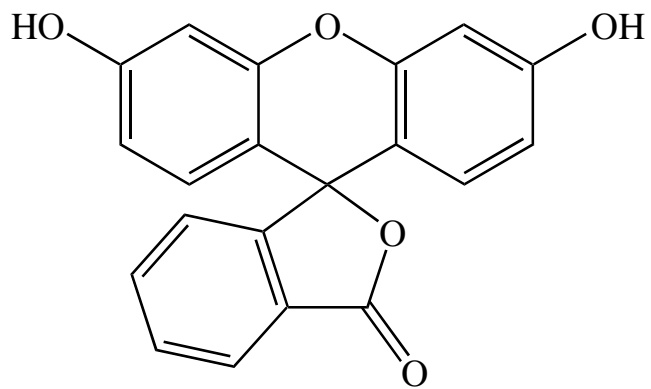


Problem Set 3 5.13 Due March 7, 2003 1PM

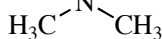
1. Isolated benzene rings generally absorb light in the UV and are colorless. The following compound is colorless but it turns red in aqueous base. Provide a detailed explanation for this result.



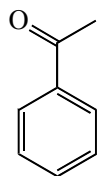
2. In addition to the diene examples given in class Woodward developed rules for benzene rings. Some representative examples are shown below. Suggest why in the second series the nitrogen substitution in the para position makes for a larger shift relative to the meta and to the top case which lacks the ketone.



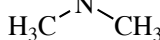
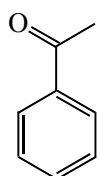
$$\lambda^{\max} = 256 \text{ nm}$$



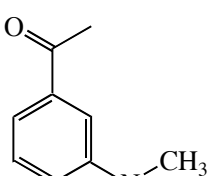
$$\lambda^{\max} = 256 \text{ nm} + 24 \text{ nm}$$



$$\lambda^{\max} = 246 \text{ nm}$$

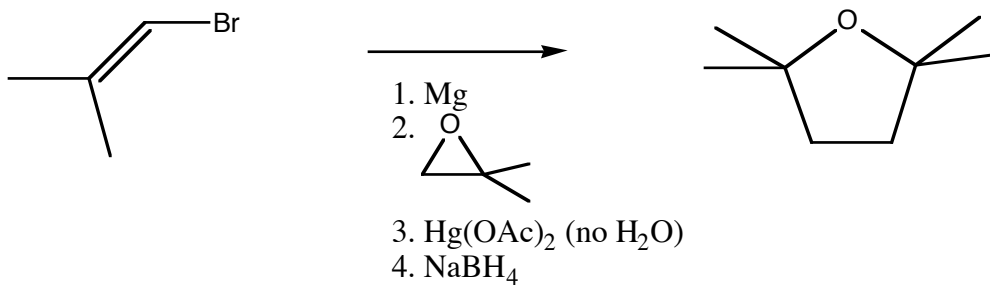


$$\lambda^{\max} = 246 \text{ nm} + 85 \text{ nm}$$



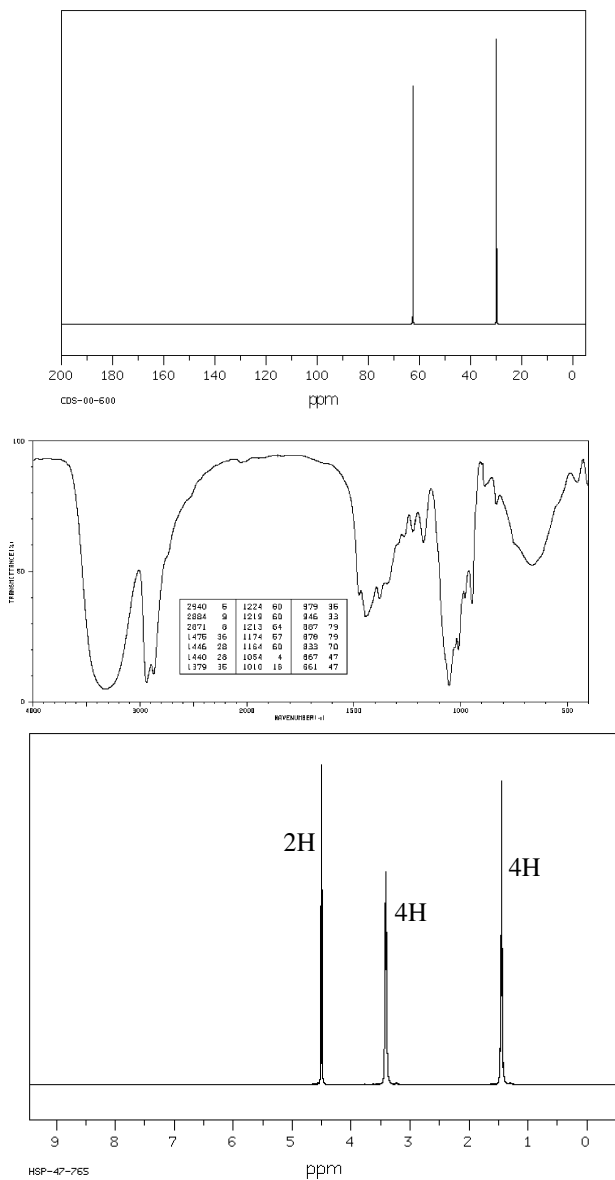
$$\lambda^{\max} = 246 \text{ nm} + 20 \text{ nm}$$

3. Show all of the intermediates and the mechanism for each step in the following transformation.



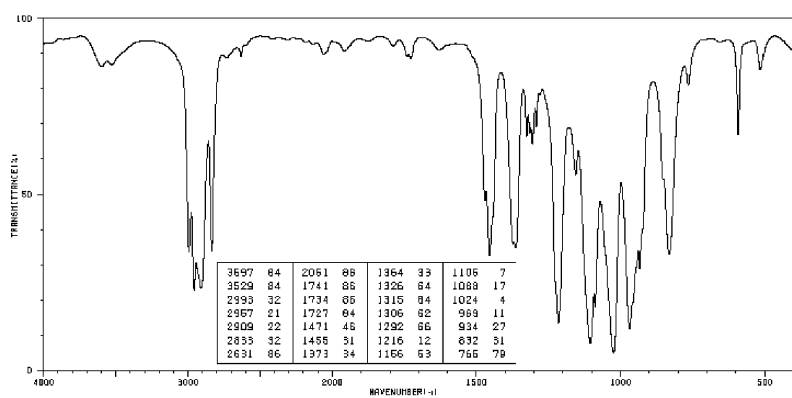
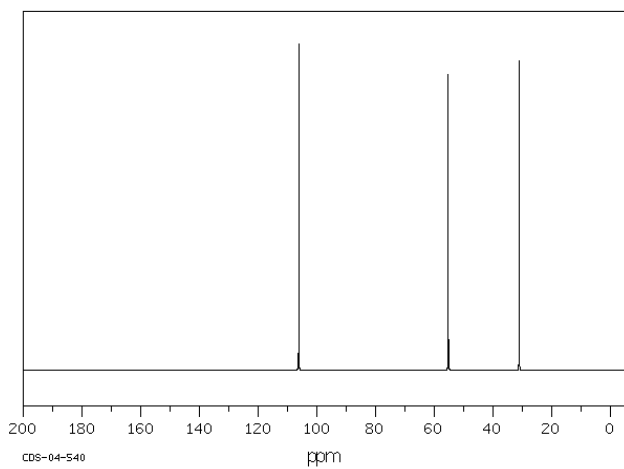
4. Compound A (F.W. = 90.1) is oxidized by pyridinium chlorochromate (PCC) in CH_2Cl_2 to give compound B (F.W. = 86) which is then treated sequentially with CH_3ONa , and CH_3I to give compound C (F.W. = 132.2) with the spectra shown and a proton NMR of 4.5 (2H, t); 3.5 (6H, s), 1.35 (4H, m). Propose structures for A, B, and C and detail the reactions. Explain your structural assignment.

IR, ^{13}C -NMR (decoupled), ^1H -NMR of Compound A.

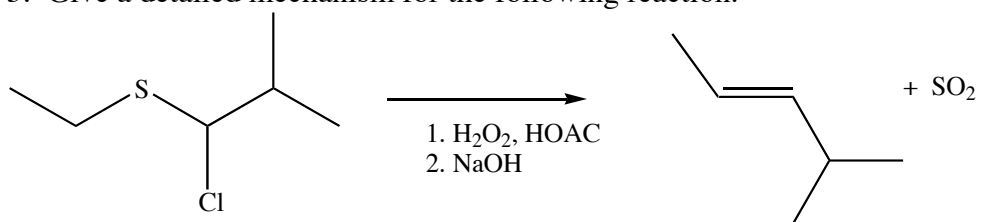


4. cont.

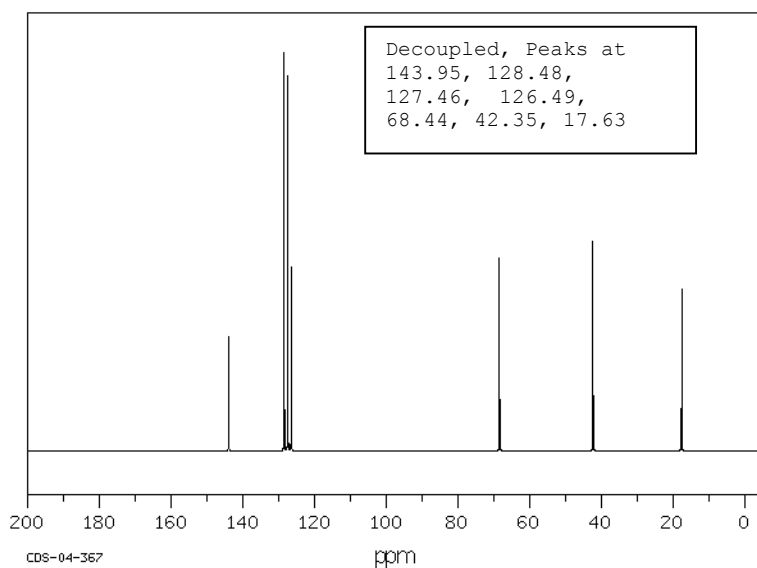
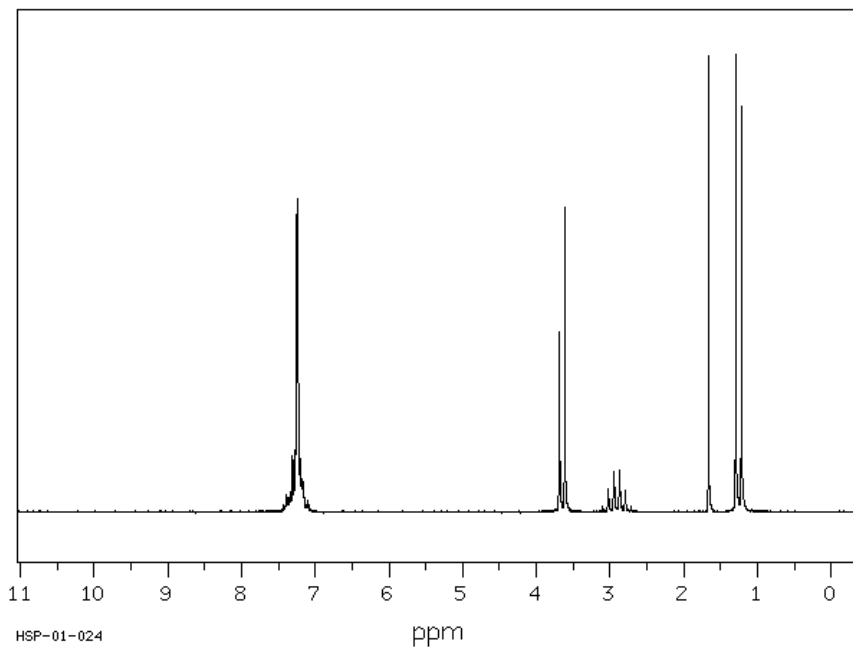
IR, ^{13}C -NMR (decoupled) of Compound C



5. Give a detailed mechanism for the following reaction.



6. The following spectra are from a compound that is produced by the product of the acid catalyzed reaction with benzene and the epoxide formed from propene. Propose a structure, provide a detailed reaction mechanism, and assign the NMR signals to the best of your ability.



cts