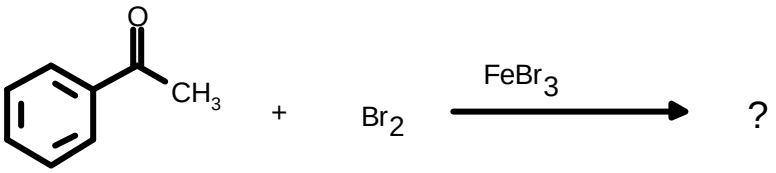
**University of Windsor**
**Chemistry and Biochemistry**

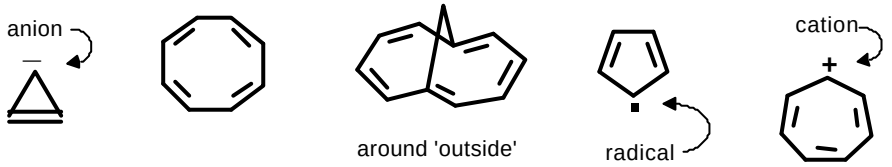
**Chemistry 59-235** **Feb. 8, 2000**
**First Test** **Time: 50 minutes**

*Note: There are questions **on both sides** of this page.*
*Note: Please write in exam booklets. Tests written in pencil will be marked, but cannot be returned for remarking.*

**1.** Give the complete mechanism for the electrophilic aromatic bromination of acetophenone (shown below). The correct answer will include the formation of the reactive electrophilic species, all reasonable resonance forms of the intermediates, and clear indications of the reasons for the regiochemical outcome. (**15 marks**)

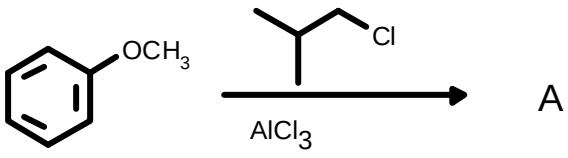



**2.** Give the number of π- electrons in the following annulenes, and classify each as aromatic, antiaromatic, or neither (the term 'nonaromatic' is commonly used) according to Hückel's Rule. Assume for this question that the π-systems *are* all 'in plane', and have *not* been forced out of plane by steric effects or effects of strain. (**5 marks**)




**3.** Predict the most reasonable structure of the major product(s) from each of the following reactions. Mechanisms are not necessary, but showing your work is likely to be a help. *Note: If there is >1 significant product, show them <u>all</u> and take the major one on to any further step.* (**5 marks for each letter, 35 marks total**).

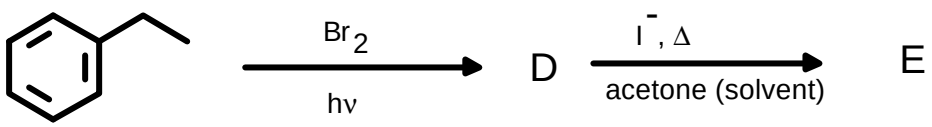
**a)**



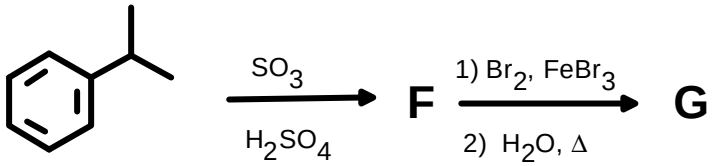

**b)**


Note: Esters are **<u>very resistant</u>** to hydrogenation

**c)**

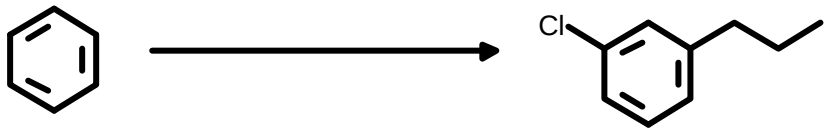



**d)**




**4.** Show by equation (in one or several steps) how you could prepare the illustrated products from the given starting material. You may use any other reagents which you deem fit. Show all reagents, conditions, and intermediates which could be isolated. Mechanisms are not necessary, but may be a help (**10 marks each, 20 marks total**).

**a.**




**b.**