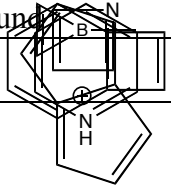
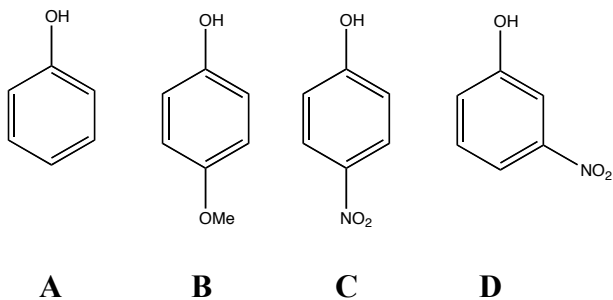


### 1. Aromaticity

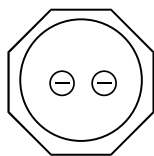
| Compound  | $\pi$ electrons | aromaticity |
|---|-----------------|-------------|
|  |                 |             |
|   |                 |             |
|   |                 |             |
|   |                 |             |
|   |                 |             |

2. Predict the trend in acidity for the following substituted phenols. Rank by increasing acidity and explain.

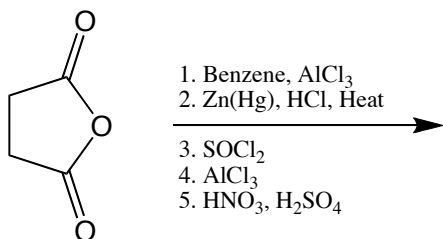
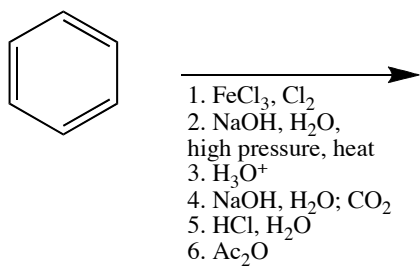
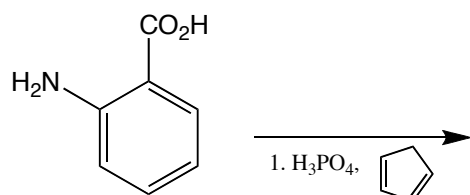
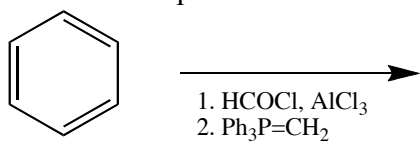
**Trend:**

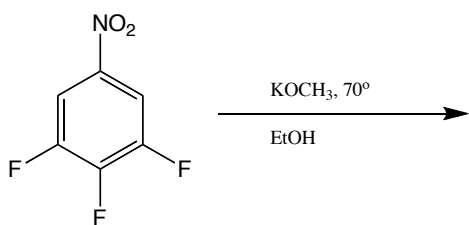
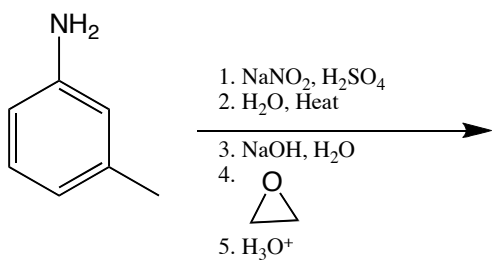


3. Draw the relative energies for the molecular orbitals of the cyclooctatetraenyl dianion. Predict the stability of this species:

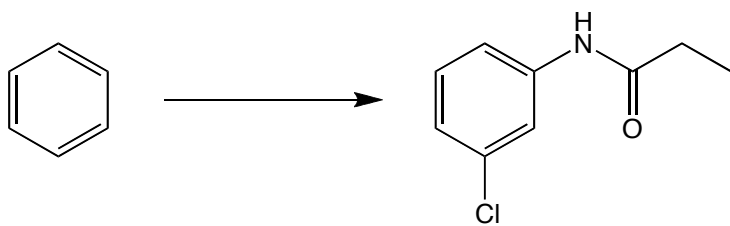
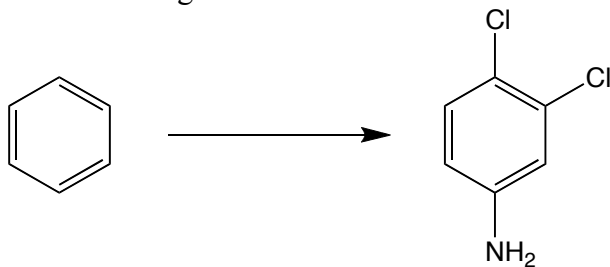


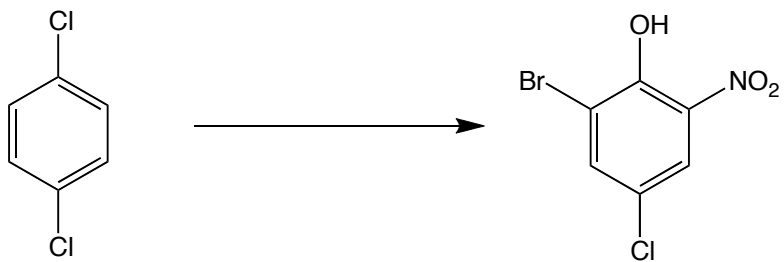
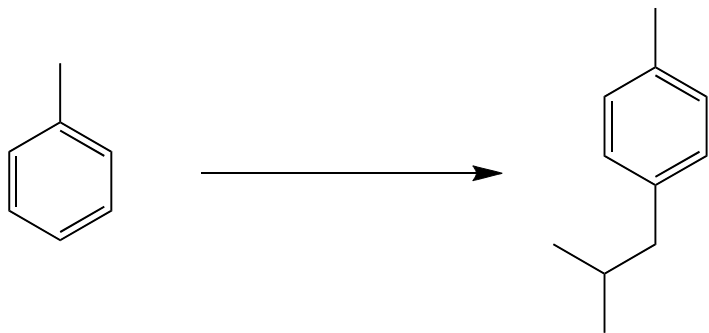
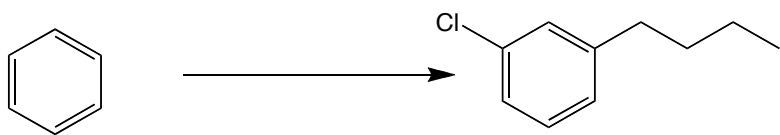
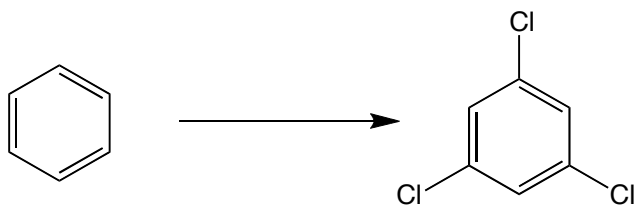
4. Predict the products:



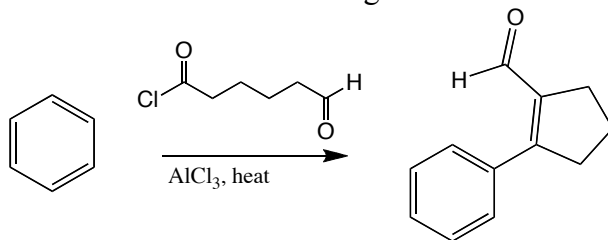


5. Provide reagents for the transformations:

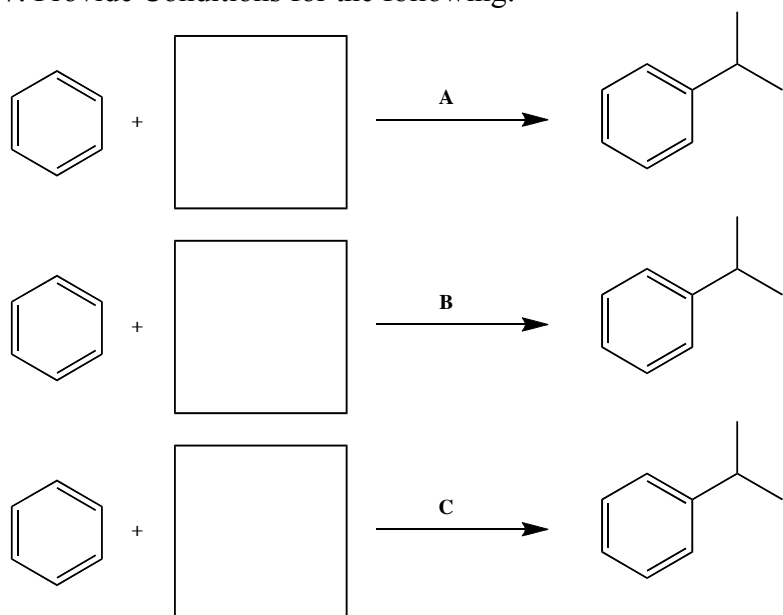


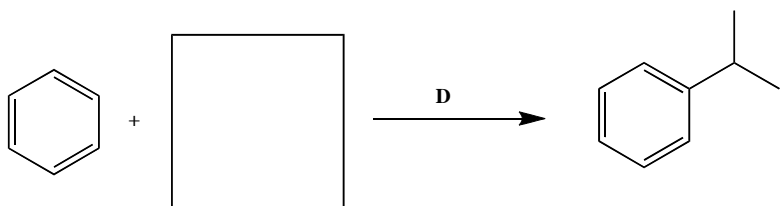


6. Remembering that  $\text{AlCl}_3$  is a Lewis Acid, and the byproduct is hydrochloric acid, propose a reasonable mechanism for the following transformation:



7. Provide Conditions for the following:





8. Mechanisms. Provide reasonable mechanisms for the following transformations

