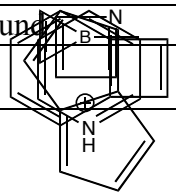
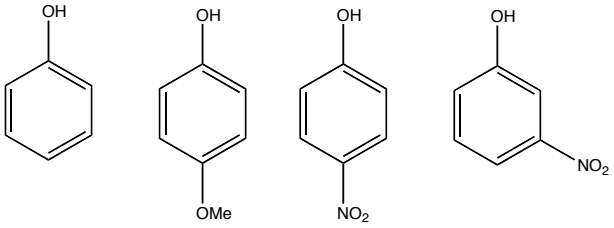
1. Aromaticity

| Compound | π electrons | aromaticity |
|---|---|---|
|  | 2 | Aromatic |
| | 6 | Non-aromatic |
| | 8 | Anti-aromatic |
| | 4 | Anti-aromatic |
| | 6 | Aromatic |

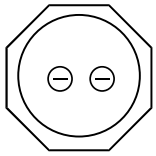
2. Predict the trend in acidity for the following substituted phenols. Rank by increasing acidity and explain.

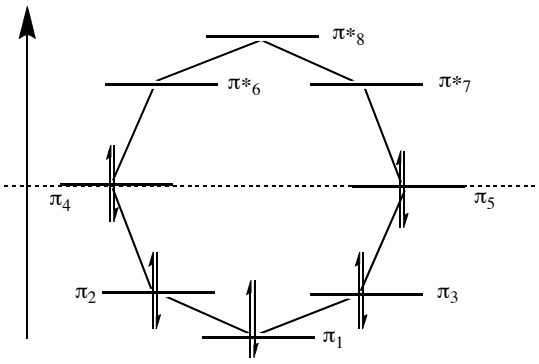
**Trend: B A D C**



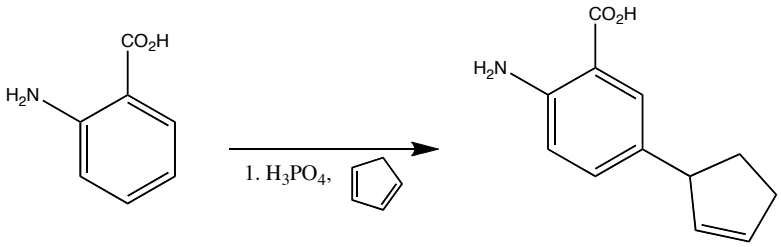

**A** **B** **C** **D**

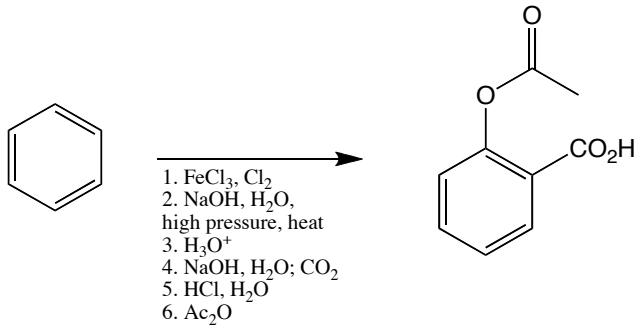
3. Draw the relative energies for the molecular orbitals of the cyclooctatetraenyl dianion. Predict the stability of this species:

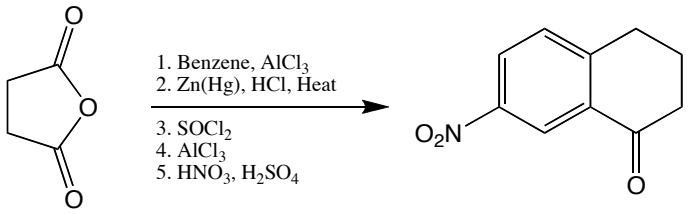


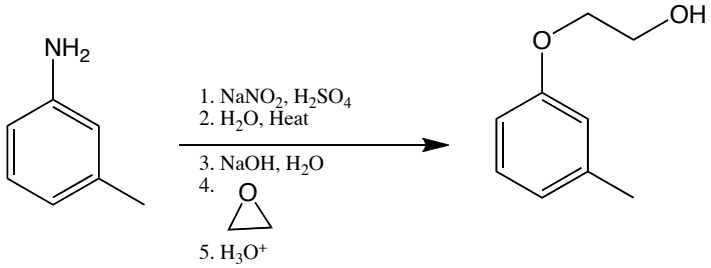


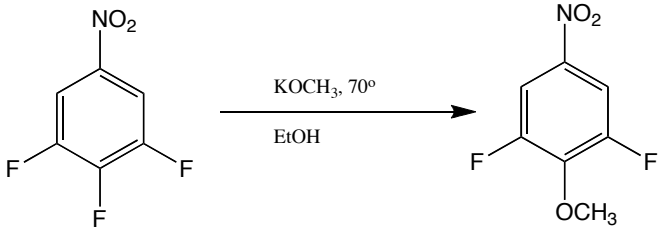
4. Predict the products:

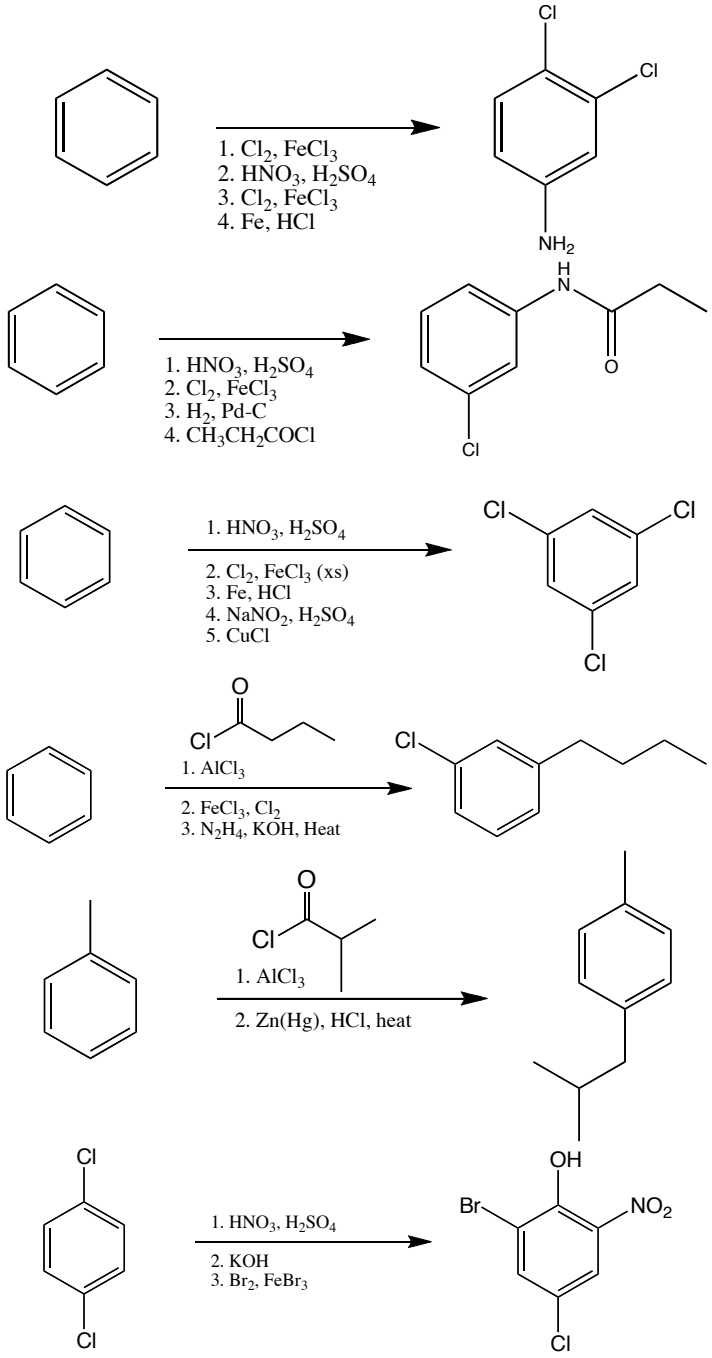



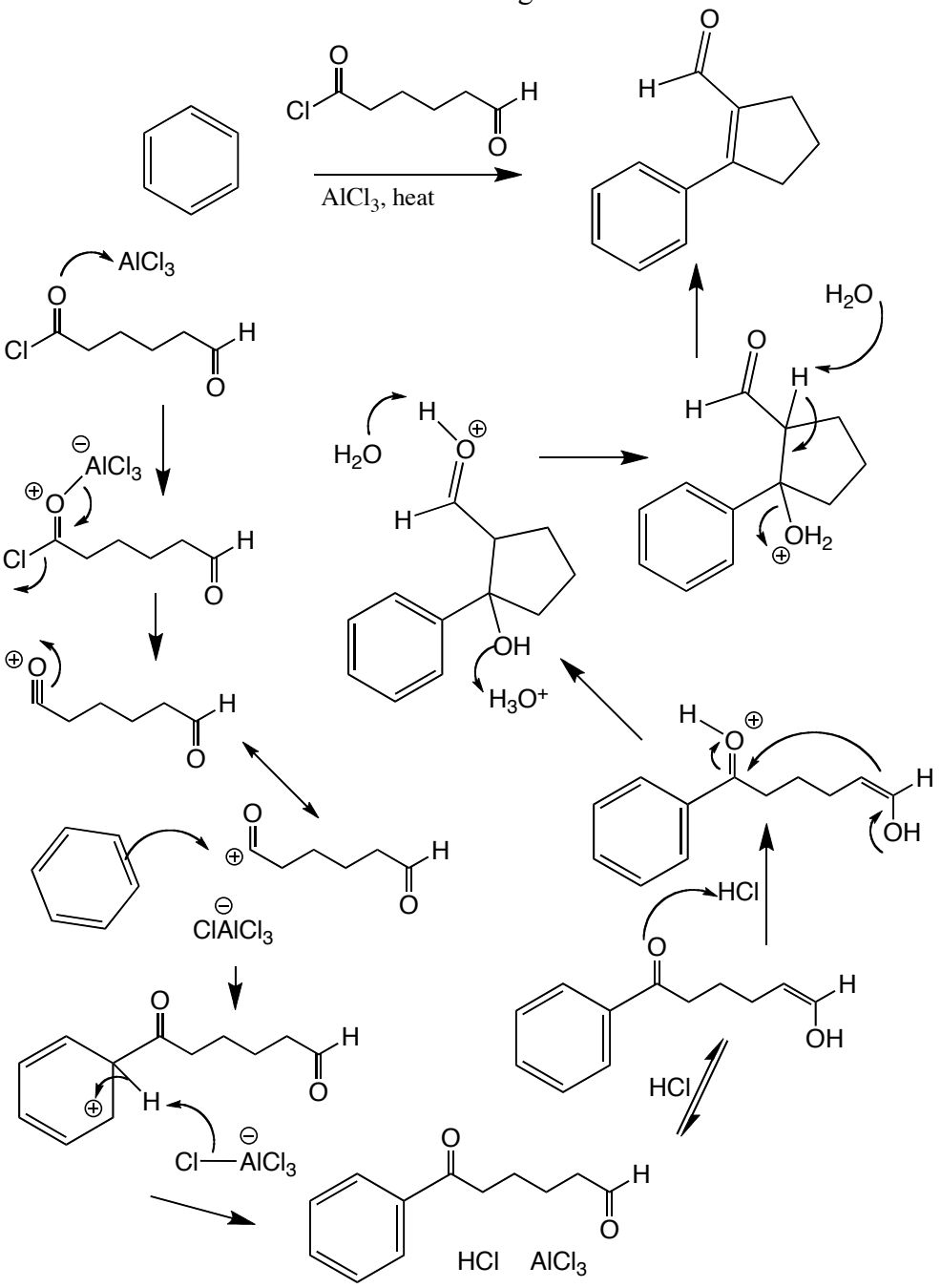



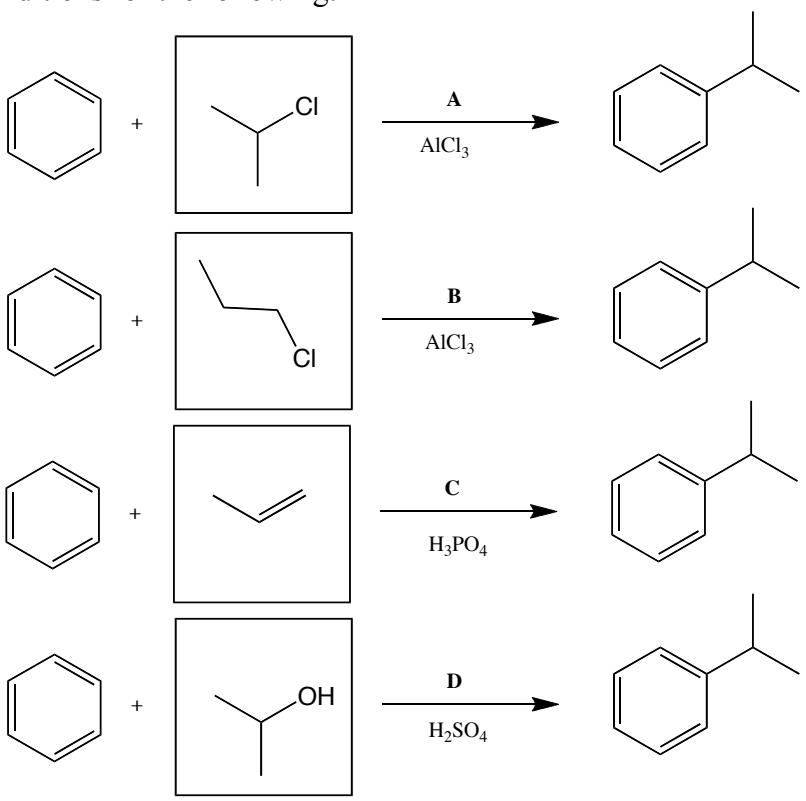
5. Provide reagents for the transformations:



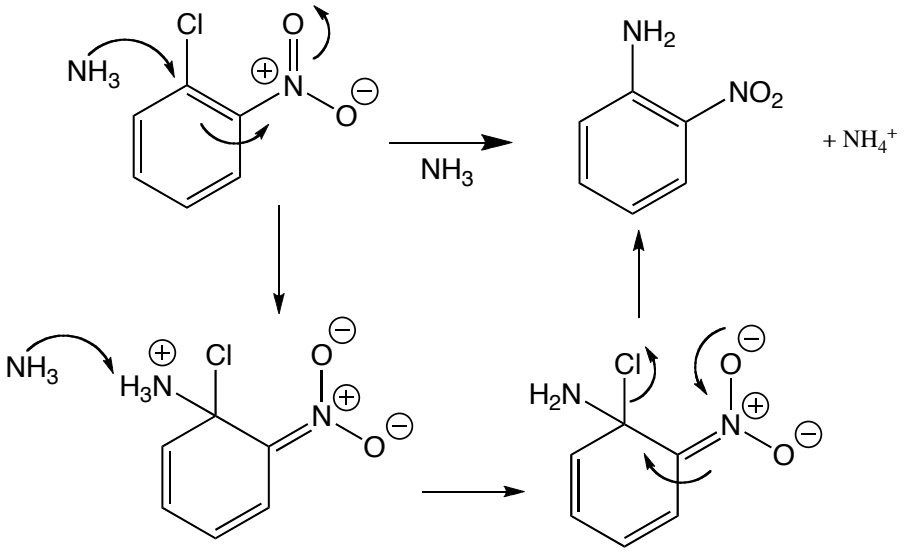
6. Remembering that $AlCl_3$ is a Lewis Acid, and the byproduct is hydrochloric acid, propose a reasonable mechanism for the following transformation:

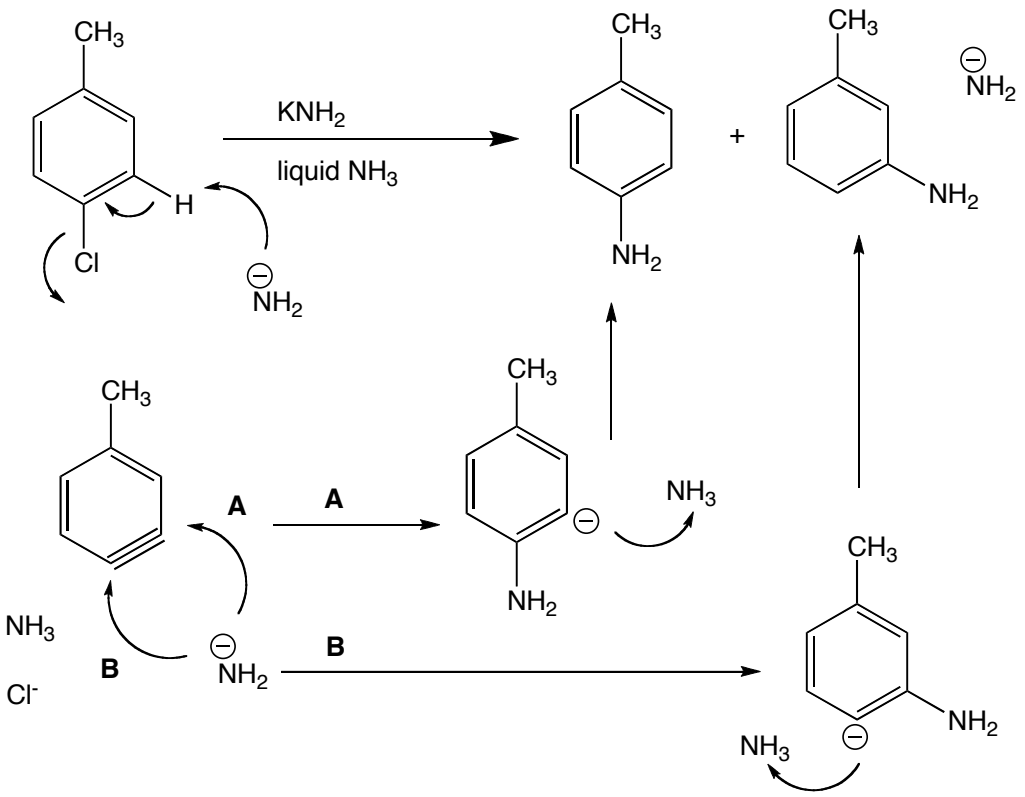


7. Provide Conditions for the following:




8. Mechanisms




CH3
KNH2
liquid NH3
H
Cl
NH2
CH3
NH2
+
CH3
NH2
A
A
CH3
NH3
NH3
Cl-
B
NH2
B
CH3
NH2
NH3