Concepts Covered:
- EAS
  - Halogenation
  - Nitration
  - Sulfation
  - Friedel-Crafts Alkylation/Acylation
    - Carbocation rearrangement

- Activating groups
  - Ortho/Para-directors

- Deactivating groups
  - Meta-directors

- Benzylic Bromination

- Reduction of ketones to CH\(_2\)

- Multistep synthesis

- **Nucleophilic Aromatic Substitution**
  - Benzyne Chemistry

1. Draw the general mechanism and resonance structures for Electrophilic Aromatic Substitution

\[
\text{Cyclic H atoms} + \text{E}^+ \rightarrow \text{E-substituted cyclic H atoms}
\]
2. Draw the mechanism for the following reactions.

A.

B.

3. Provide the necessary reagents to produce the product with the given starting material

A.

B.
4. Provide the product produced by each of the following reactions

A.

B.

C.
5. Provide the starting material for each of the following reactions

A.

B.

C.
6. Determine whether the reactant will add ortho/para or meta and draw the product

A. 

B. 

C. 

\[ \text{C} \rightarrow \text{C} \rightarrow \text{N} \]
7. Which of the following product(s) are possible from a starting benzene

8. Show the mechanism for the following reaction