1. Rank the following arenes from fastest to slowest rate in electrophilic aromatic substitution (EAS)

\[
\text{NO}_2 \quad \text{OMe} \quad \text{CH}_3
\]

A > B > C

2. Label each directing group as an ortho, meta or para director. You can check more than one box.

\[
\begin{array}{ccc}
\text{NO}_2 & \quad & \text{OCH}_3 \\
\text{O} & \text{CH}_3 & \text{Br} \\
\text{Cl} & \quad & \text{H}_3\text{C} \\
\text{CN} & \quad & \text{SO}_3\text{H} \\
\text{NMe}_2 & \\
\end{array}
\]
2. Fill in the boxes with the appropriate starting material, reagent or major product. You can ignore stereochemistry.

a. 

b. 

c. 

d. 

e. 

3. Predict the products and provide an arrow-pushing mechanism. Draw all resonance structures for intermediates.

4. Fill in the retrosynthesis with the appropriate compounds.
5. Propose syntheses of the targets shown below. **All carbons** in the product must come from the starting materials provided, you can use any reagent you wish.
6. Propose syntheses of the targets shown below. **All carbons** in the product must come from the starting materials provided, you can use any reagent you wish.