

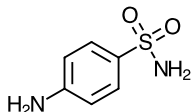
Objective 8. Understand electrophilic aromatic substitution reactions (EAS) of substituted aromatics (Sp 18) disubstituted and polysubstituted aromatics (Sp 19).

In Class problems:

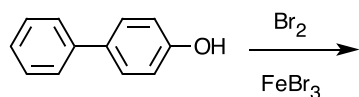
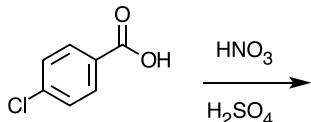
0. Aromatic compounds with multiple substituents undergo EAS reactions. The **more activating** group directs the position of substitution.

Rank the groups from most to least activating: Cl, OCH₃, COOH, COCH₃, OCOCH₃, NH₂, NO₂.

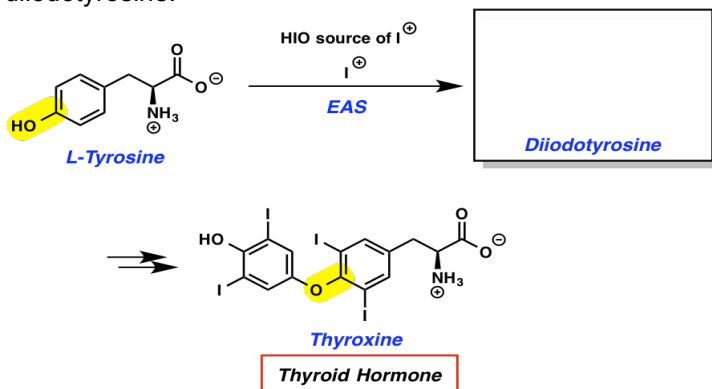
1. a. Sulfanilamide is an antibiotic. Which group directs EAS?



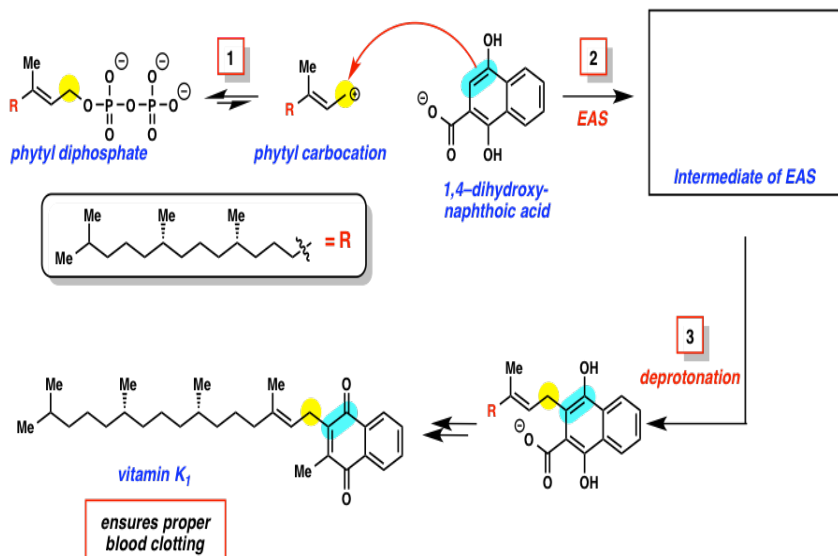
b. For each reaction, identify the group that directs EAS. Then, predict the product.



c. From LearnBacon.com: Iodine is an essential nutrient. Iodine deficiency leads to goiter, which occurs because thyroxine (thyroid hormone) cannot be generated without iodine. Which group directs EAS? Draw the structure of diiodotyrosine.

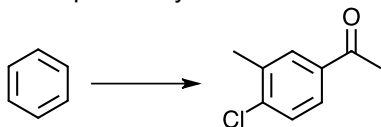


d. From LearnBacon.com: biosynthesis of Vitamin K. Which group directs EAS? Draw the structure of Intermediate.

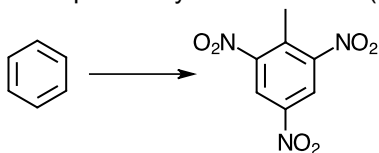


2. Synthesis: The order in which substituents are introduced onto a benzene ring requires **planning** due to o, p or m directing effects.

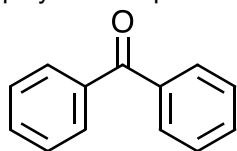
a. Propose a synthesis:



b. Propose a synthesis of TNT (explosive):



c. Benzophenone (shown below) is added to plastic packaging as a UV blocker to prevent photo-degradation of the plastic polymer. Propose a synthesis of benzophenone from benzene. Hint: make bromobenzene and benzyl alcohol.



d. Vanilla is used in many foods from ice cream to cookies. There is a vanilla shortage!

(<http://cen.acs.org/articles/94/i36/problem-vanilla.html>)

Propose a synthesis of vanillin from each source.

