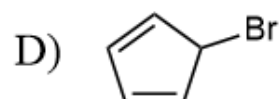
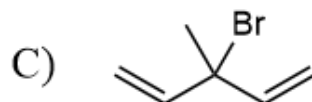
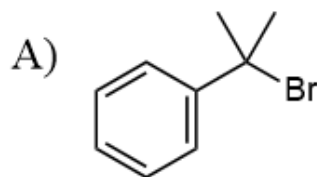


CHM 3150 Organic Chemistry II
Dr. Laurie S. Starkey, Cal Poly Pomona
Chapter 18, Aromatic Reactions (Ch 17/18 Part 2) – [Practice Problems](#)

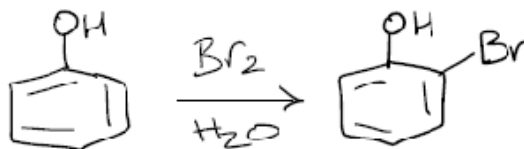
For clicker question voting, go to:
<https://pollev.com/lauriestarke263>



1 Of the following, which is LEAST likely to undergo an S_N1 reaction with ethanol?

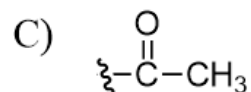
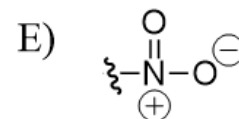
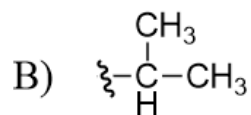
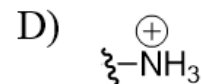
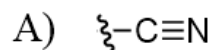


2 Provide a mechanism for the following reaction.

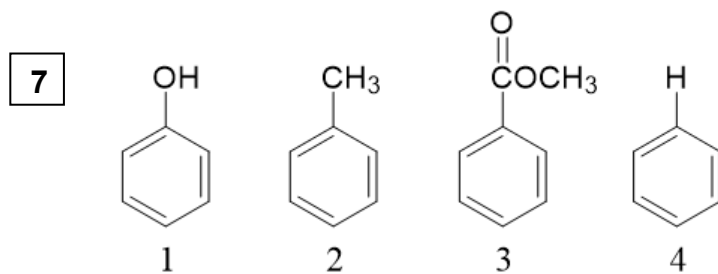
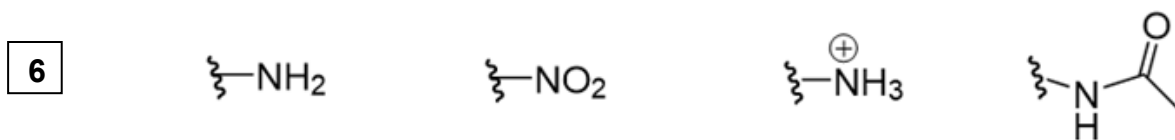


3 What effect on reactivity toward the Electrophilic Aromatic Substitution reaction would you expect if an **electron-withdrawing group** was placed on the aromatic ring?

4 For the Electrophilic Aromatic Substitution reaction, which of the following does NOT act as an **electron-withdrawing group**?



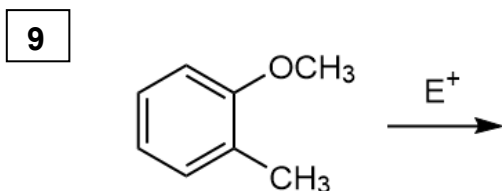
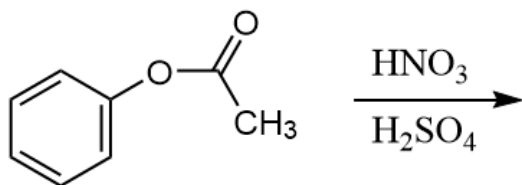
Categorize each of the following groups as an **ortho/para director** or a **meta director**.



Arrange the molecules shown above in order of **INCREASING** reactivity toward electrophilic aromatic substitution, from least reactive to most reactive?

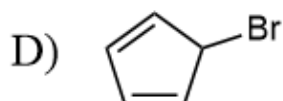
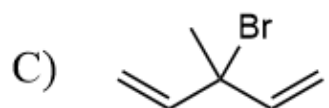
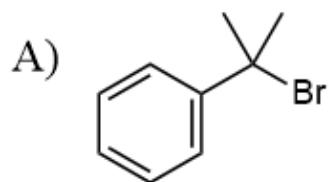
8

Predict the major product of the following nitration reaction and explain the regiochemistry.



1

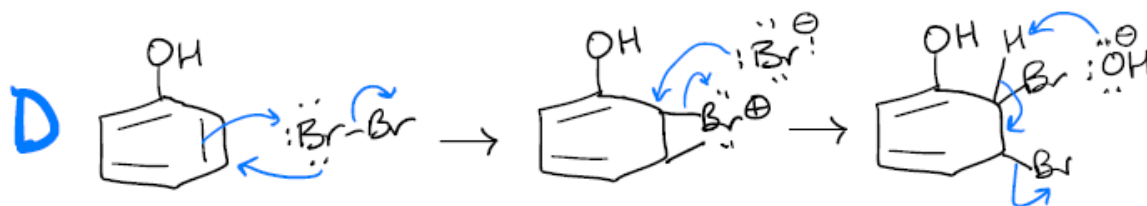
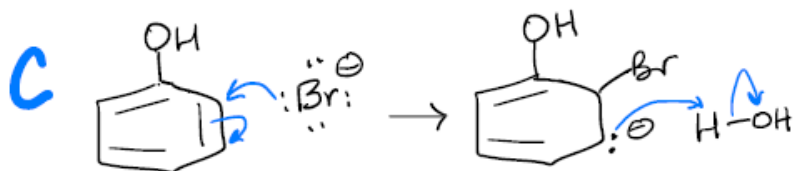
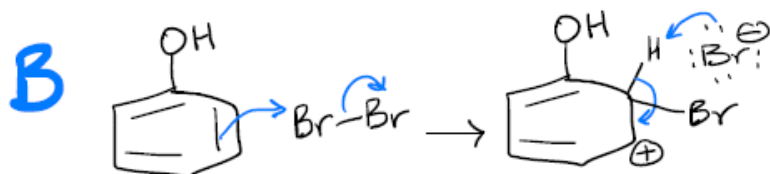
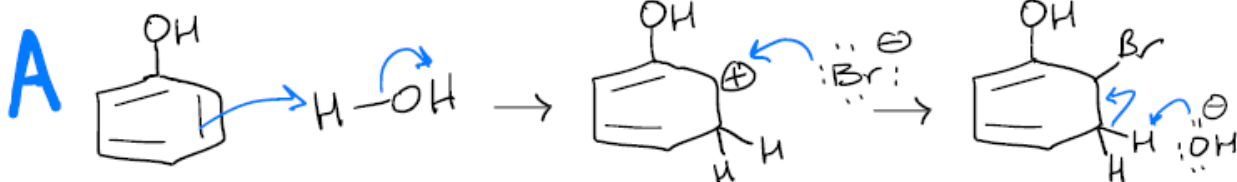
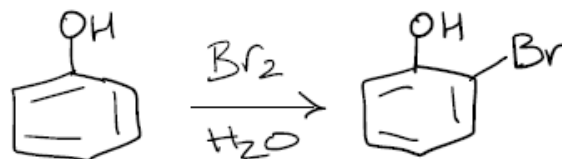
Of the following, which is LEAST likely to undergo an S_N1 reaction with ethanol?



see Klein Ch. 17, ACS-style question

2

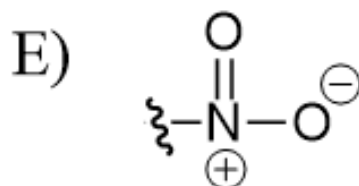
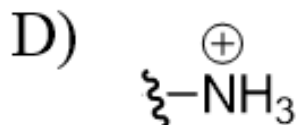
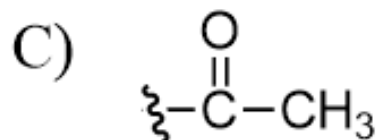
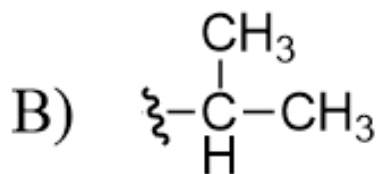
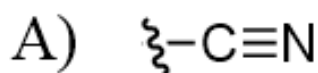
Provide a mechanism for the following reaction.



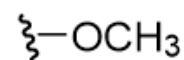
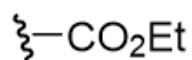
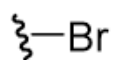
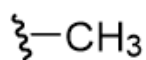
3 What effect on reactivity toward the Electrophilic Aromatic Substitution reaction would you expect if an **electron-withdrawing group** was placed on the aromatic ring?

- A) I would expect the ring to be MORE reactive, because the ring is acting as a nucleophile.
- B) I would expect the ring to be LESS reactive, because the ring is acting as a nucleophile.
- C) I would expect the ring to be MORE reactive, because the ring is acting as an electrophile.
- D) I would expect the ring to be LESS reactive, because the ring is acting as an electrophile.
- E) I would expect NO effect on the reactivity of the ring (steric hindrance is the most important factor).

4 For the Electrophilic Aromatic Substitution reaction, which of the following does NOT act as an **electron-withdrawing group**?



5 Categorize each of the following groups as an **ortho/para director** or a **meta director**.



A) o/p

meta

o/p

meta

B) o/p

o/p

meta

meta

C) meta

meta

meta

o/p

D) o/p

o/p

meta

o/p

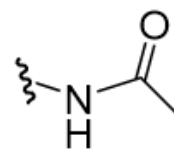
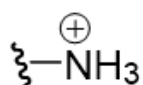
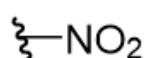
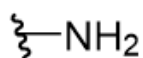
E) meta

meta

o/p

meta

6 Categorize each of the following groups as an **ortho/para director** or a **meta director**.



A) o/p

meta

meta

o/p

B) o/p

meta

meta

meta

C) meta

o/p

meta

meta

D) o/p

o/p

meta

o/p

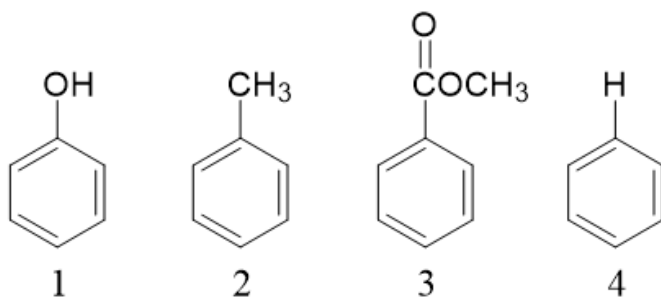
E) meta

meta

o/p

meta

7

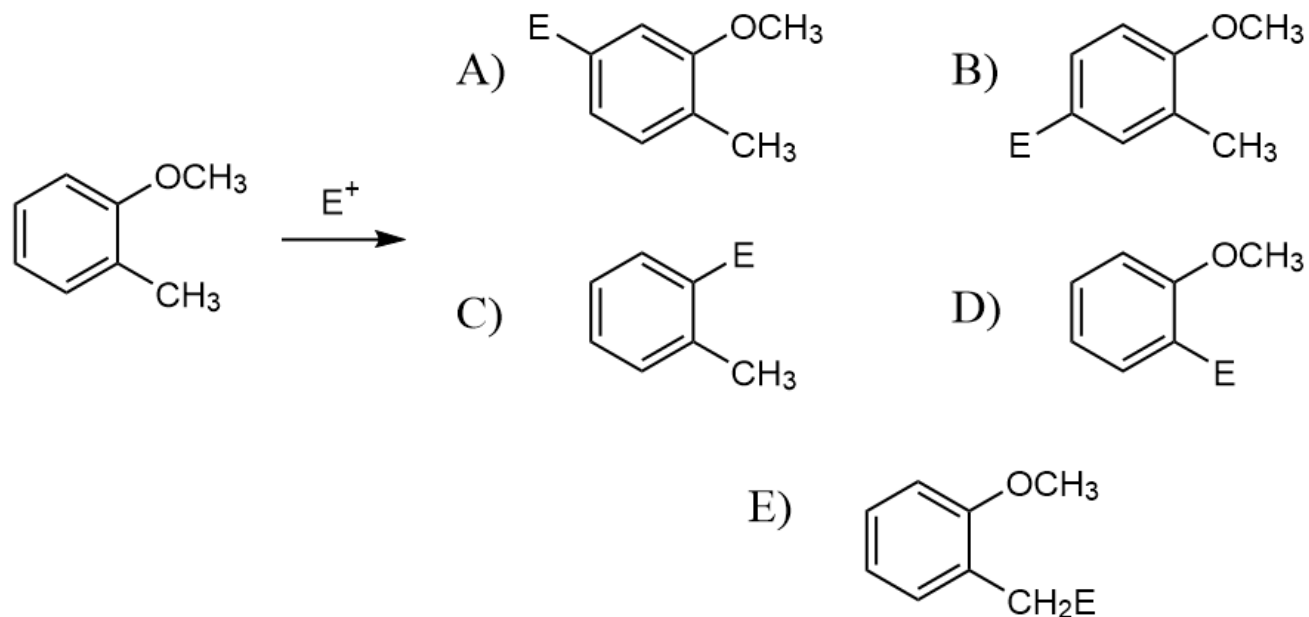


In which of the following are the molecules shown above listed in order of INCREASING reactivity toward electrophilic aromatic substitution, from least reactive to most reactive?

- A) $2 < 4 < 1 < 3$
 B) $3 < 2 < 4 < 1$
 C) $3 < 4 < 2 < 1$
 D) $4 < 2 < 1 < 3$
 E) $4 < 3 < 1 < 2$

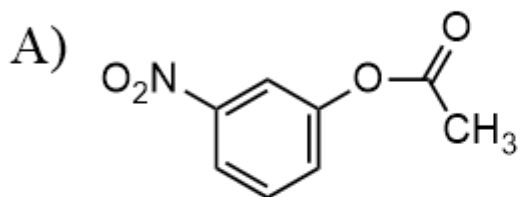
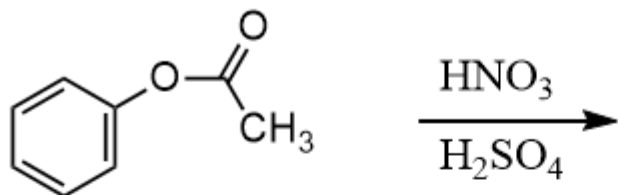
8

Predict the major product.

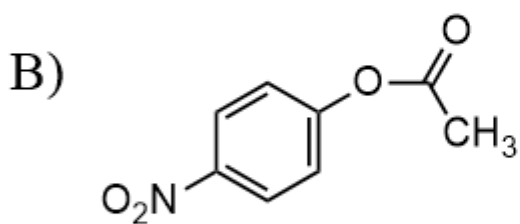


9

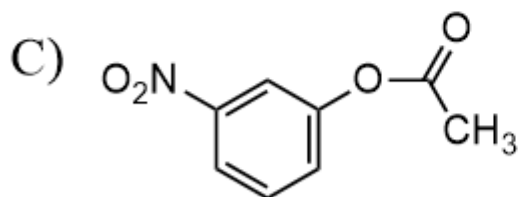
Predict the major product of the following nitration reaction and explain the regiochemistry.



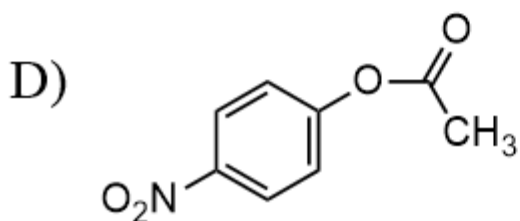
(because -NO₂ is a meta director)



(because -NO₂ is an ortho/para director)



(because -OAc is a meta director)



(because -OAc is an ortho/para director)