


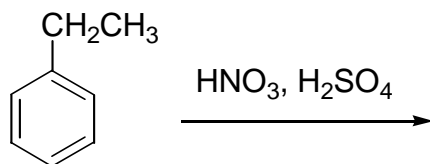
NAME: _____

To **not** have your graded script placed outside my office please check this box **(1-10) Are True or False**

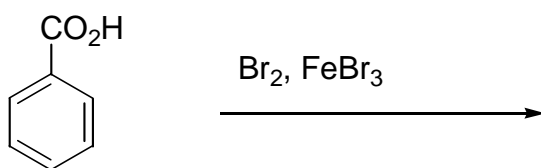
- 1) Benzene undergoes electrophilic aromatic substitution reactions with strong electrophiles.
- 2) During an electrophilic aromatic substitution, the aromatic compound loses its aromaticity in the first step, but then regains it in the last step of the reaction.
- 3) Ortho substitution means a 1,3 arrangement on a benzene ring.
- 4) The rate determining step in an electrophilic aromatic substitution is the exothermic removal of a proton from the sp^3 carbon.
- 5) Ethylbenzene undergoes nitration and bromination faster than benzene.
- 6) Friedal Crafts alkylation products undergo poly-substitution since the products generated are activated to further reaction.
- 7) This compound is 6π Hückel aromatic.

- 8) The amino group ($-NH_2$) is an ortho, para directing, activating substituent for electrophilic aromatic substitution.
- 9) The nitro group ($-NO_2$) is a pi-donating substituent, and thus an activating group for electrophilic aromatic substitution reactions.
- 10) Halogen substituents direct ortho, para since they π donate electron density.

11-15) Give the products for the following reactions (and indicate stereo/regiochemistry where applicable).

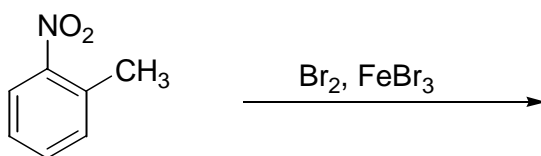
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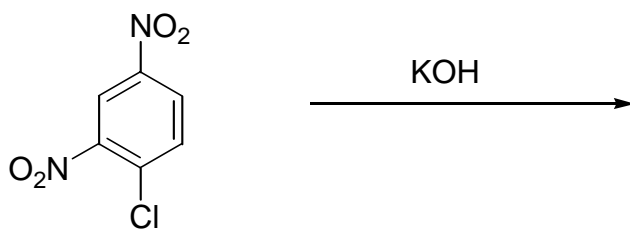
12)



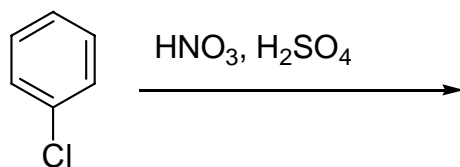
13)



14)

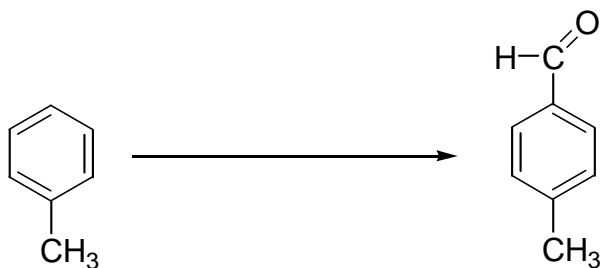


15)



16-18) Give reagents and conditions for the following transformations.

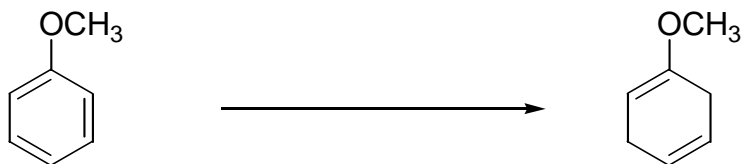
16)



17)

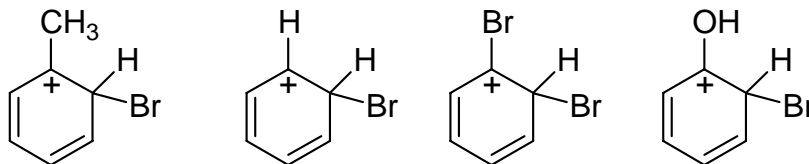


18)

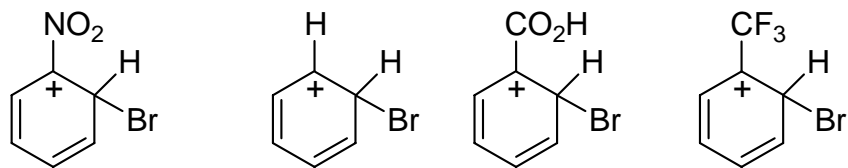


19 - 20) Circle the most stable sigma complex in the following sets.

19)




20)



BONUS QUESTION for up to 2 extra points

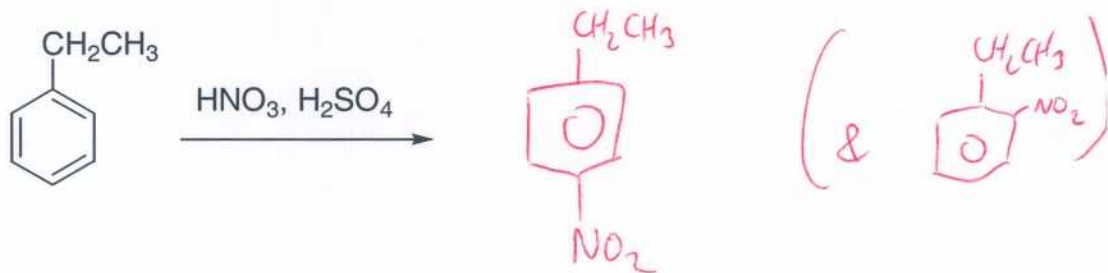
Predict whether **phenol** or **phenoxide** is more reactive towards electrophilic aromatic substitution, and justify your prediction.

NAME: CANDACE B. SOESSAYTo **not** have your graded script placed outside my office please check this box **(1-10) Are True or False**

- 1) Benzene undergoes electrophilic aromatic substitution reactions with strong electrophiles. **T**
- 2) During an electrophilic aromatic substitution, the aromatic compound loses its aromaticity in the first step, but then regains it in the last step of the reaction. **T**
- 3) Ortho substitution means a 1,3 arrangement on a benzene ring. **F**
- 4) The rate determining step in an electrophilic aromatic substitution is the exothermic removal of a proton from the sp^3 carbon. **F**
- 5) Ethylbenzene undergoes nitration and bromination faster than benzene. **T**
- 6) Friedal Crafts alkylation products undergo poly-substitution since the products generated are activated to further reaction. **T**
- 7) This compound is 6π Hückel aromatic. **T**

- 8) The amino group ($-NH_2$) is an ortho, para directing, activating substituent for electrophilic aromatic substitution. **T**
- 9) The nitro group ($-NO_2$) is a pi-donating substituent, and thus an activating group for electrophilic aromatic substitution reactions. **F**
- 10) Halogen substituents direct ortho, para since they π donate electron density. **T**

11-15) Give the products for the following reactions (and indicate stereo/regiochemistry where applicable).

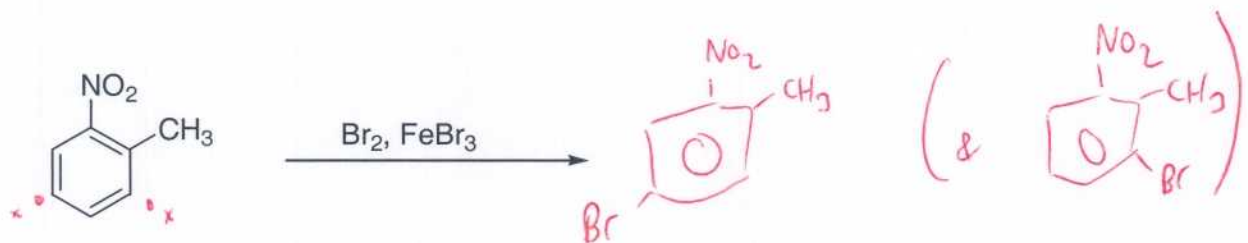
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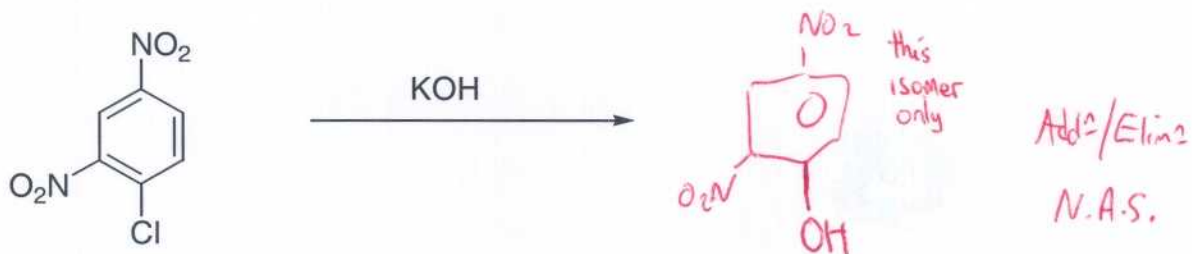
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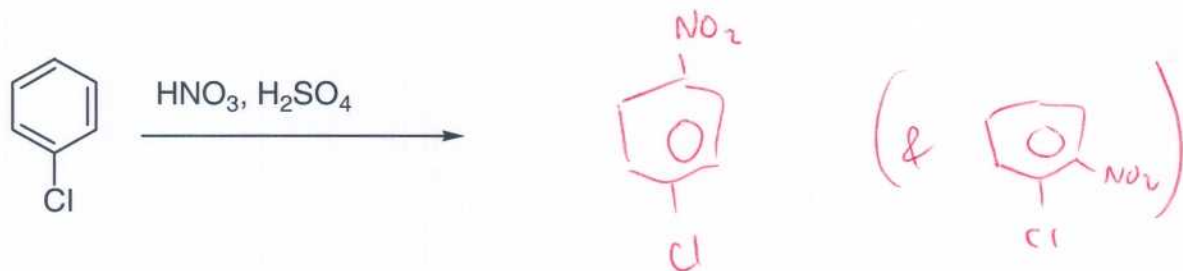
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14)

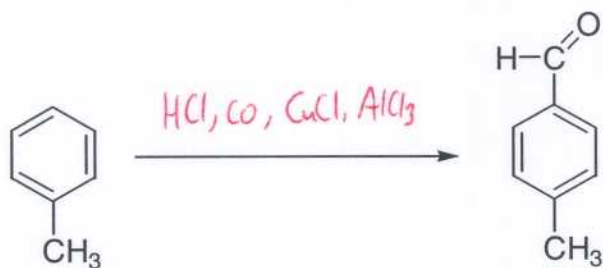


15)

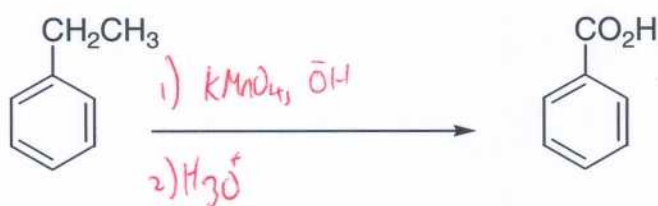


16-18) Give reagents and conditions for the following transformations.

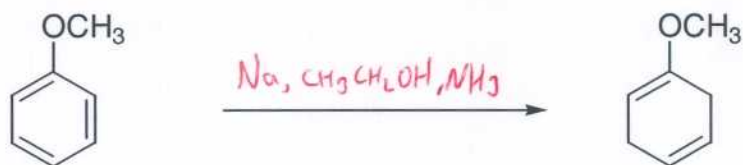
16)



17)

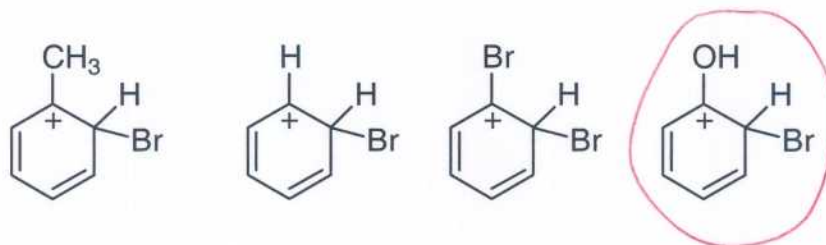


18)

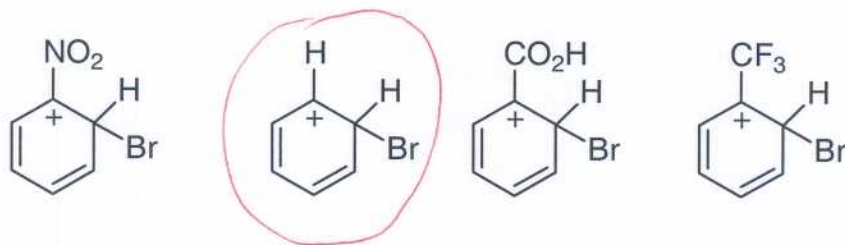


19 - 20) Circle the most stable sigma complex in the following sets.

19)

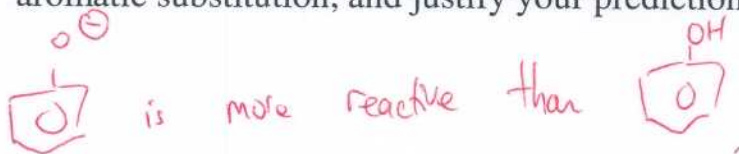


20)



BONUS QUESTION for up to 2 extra points

Predict whether **phenol** or **phenoxide** is more reactive towards electrophilic aromatic substitution, and justify your prediction.



A -ve nucleophile is more reactive than its neutral analogue (it gives a more stable -i.e. neutral σ complex).

