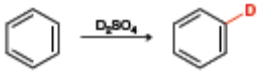
Lista de exercícios EXTRA – Planejamento de síntese usando SEA
1012020 - Química Orgânica II (2023) – Farmácia Noturno

1. Escreva o mecanismo das transformações abaixo:

a)

b)



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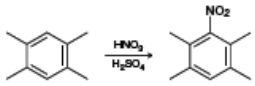
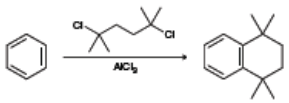


d)



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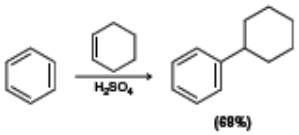

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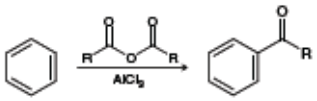
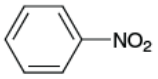
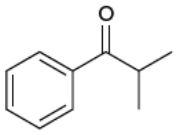
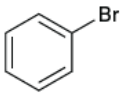
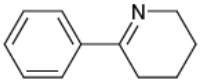


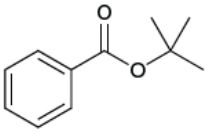
18.16 For each of the following compounds, predict whether the ring is activated or deactivated toward electrophilic aromatic substitution, then predict the strength of activation/deactivation, and finally predict the expected directing effects.

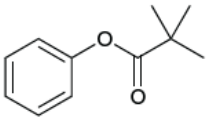
(a) 

(b) 

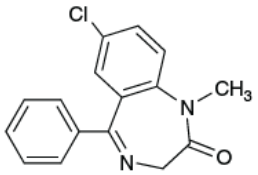
(c) 

(d) 

(e) 

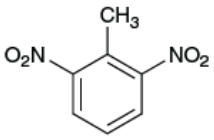
(f) 

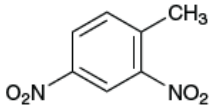
18.17 Diazepam is a prescription medication first marketed under the trade name Valium, and used to treat anxiety disorders.[1] Predict whether the monosubstituted aromatic ring in diazepam is activated or deactivated toward electrophilic aromatic substitution, and predict the strength of the activation/deactivation (strong, moderate, or weak). Finally, predict the directing effects of the substituent on that ring.

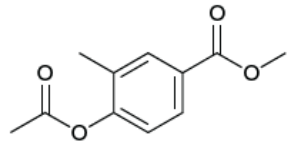


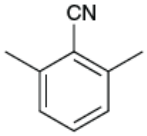
Diazepam

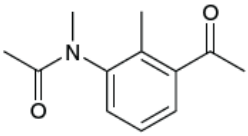
18.18 For each compound below, identify which position(s) is/are most likely to undergo an electrophilic aromatic substitution reaction.

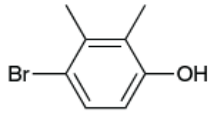
(a) 

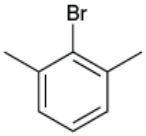
(b) 

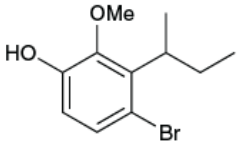
(c) 

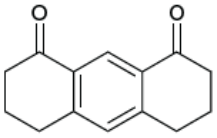
(d) 

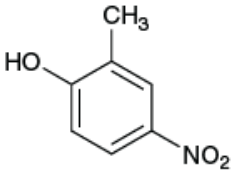
(e) 

(f) 

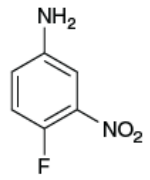
(g) 

(h) 

(i) 

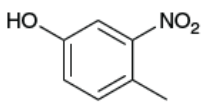
j) 

18.19 4-Fluoro-3-nitroaniline is a patented synthetic precursor used in the production of commercial hair dyes.[2] Identify the position(s) on this compound most likely to undergo electrophilic aromatic substitution.



18.20 For each of the following compounds, determine the position that is most likely to be the site of an electrophilic aromatic substitution reaction:

(a)



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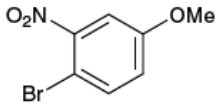

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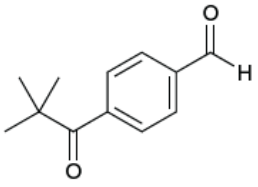

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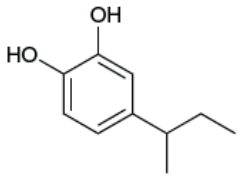
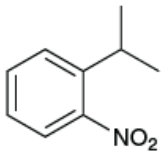
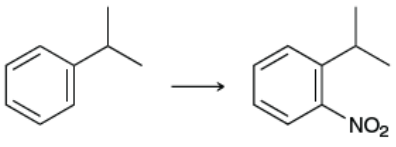


e)



18.22 Determine whether a blocking group is necessary to accomplish each of the following transformations:

(a)



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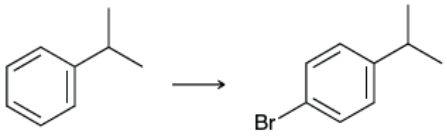

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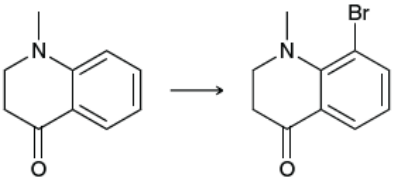
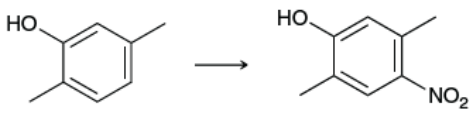


(d)



18.23 The flavor of beer can be tainted by even trace amounts of a contaminant called *ortho*-bromophenol. To reduce the incidents of contamination, beer manufacturers have used certified beer flavor standards to train professional beer tasters to recognize the flavor of *ortho*-bromophenol. Preparing these certified standards requires pure samples of *ortho*-bromophenol.[4] Propose a synthesis of *ortho*-bromophenol starting from phenol.

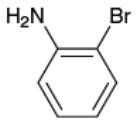
18.24 Identify reagents that can be used to convert benzene into each of the following compounds:

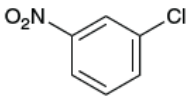
(a) Chlorobenzene
(b) Nitrobenzene
(c) Bromobenzene
(d) Ethylbenzene
(e) Propylbenzene
(f) Isopropylbenzene
(g) Aniline (aminobenzene)
(h) Benzoic acid
(i) Toluene

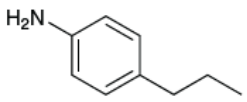
18.25 Identify the product obtained when benzene is treated with each of the following reagents:

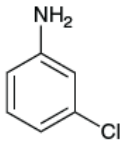
(a) Fuming sulfuric acid
(b) HNO_3/H_2SO_4
(c) Cl_2, $AlCl_3$
(d) Ethyl chloride, $AlCl_3$
(e) Br_2, $FeBr_3$
(f) HNO_3/H_2SO_4 followed by Zn, HCl, followed by NaOH

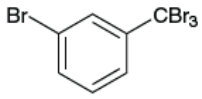
18.26 Starting with benzene and using any other necessary reagents of your choice, design a synthesis for each of the following compounds. **Note**: some of these problems have more than one plausible answer.

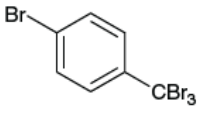
(a) 

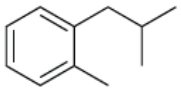
(b) 

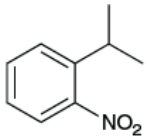
(c) 

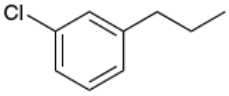
(d) 

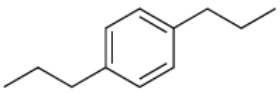
(e) 

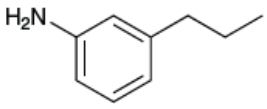
(f) 

(g) 

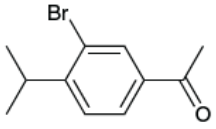
(h) 

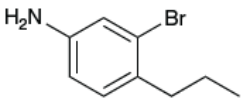
(i) 

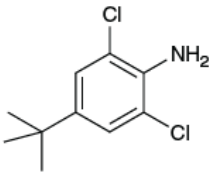
(j) 

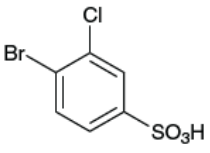
L) 

18.28 Starting with benzene and using any other necessary reagents of your choice, design a synthesis for each of the following compounds. In some cases, there may be more than one plausible solution.

(a) 

(b) 

(c) 

(d) 

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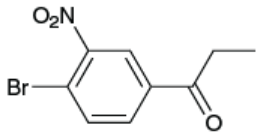
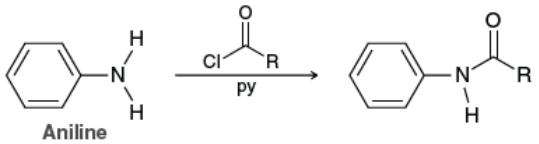


18.29 We will see in Chapter 20 that derivatives of aniline will react with acyl chlorides (RCOCl) in the presence of pyridine (a base) to yield aromatic amides, as shown below for the parent aniline:



The drug flutamide, sold under the trade name Eulexin, is used to treat prostate cancer by decreasing the action of male hormones.[6] Starting with (trifluoromethyl)benzene, propose a synthesis of flutamide. **Note**: You will need to use the amide-forming reaction above.