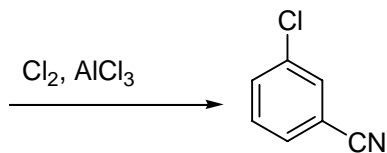


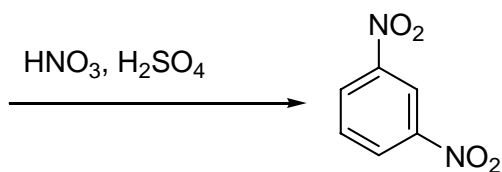


11-12) Give the starting materials for the following reactions.

11)

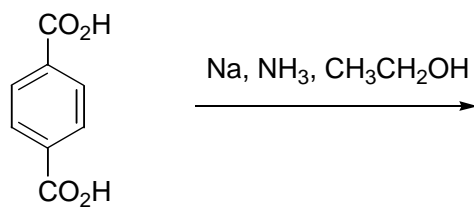


12)

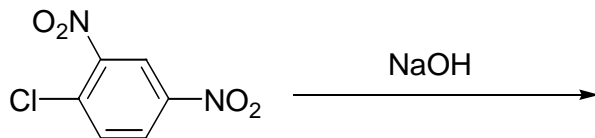


13-14) Draw the products.

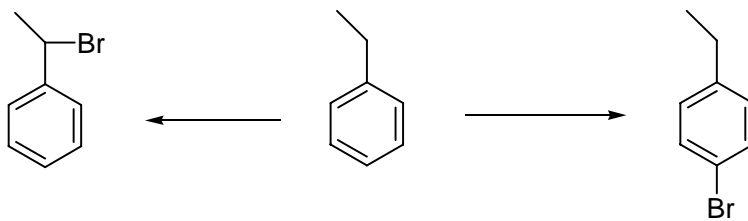
13)



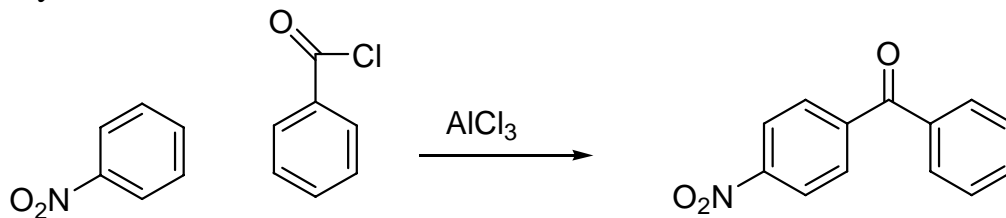
14)



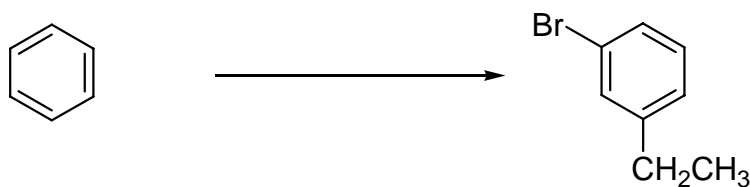
15-16) Give the reagents for both of these substitutions.



17-18) State **two** fundamental problems with the below Friedal Crafts acylation reaction.



19-20) Bearing in mind that  $-\text{CH}_2\text{CH}_3$  and  $-\text{Br}$  are both ortho/para directors, design a synthetic route for the below transformation.



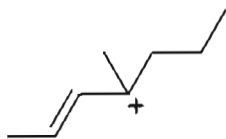
NAME:

ANNIE SOUL

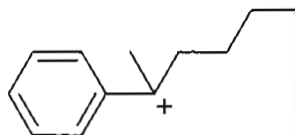
If you object to your graded script being placed in a box outside my office then check here \_\_\_\_\_

(1-10) are True or False.

- 1) Toluene (methylbenzene) is a  $6\pi$  Hückel aromatic compound. TRUE
- 2) Conversion of benzene to nitrobenzene proceeds via electrophilic aromatic substitution. TRUE
- 3) Para substitution means a 1,4 arrangement on a benzene ring. TRUE
- 4) The formation of the sigma complex for an electrophilic aromatic substitution is exothermic. FALSE
- 5) Oxidation of phenols generates quinones. TRUE
- 6) Birch reduction reaction conditions include hydrogen gas and a catalyst. FALSE
- 7) Oxidative cleavage of n-butylbenzene with hot, basic potassium permanganate produces a benzoic acid potassium salt. TRUE
- 8) Iodine is a meta directing, activating substituent for electrophilic aromatic substitution. FALSE
- 9)



is more stable than



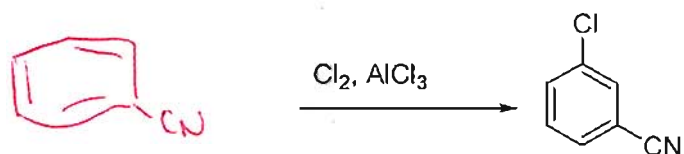
FALSE

- 10) Catalysts such as  $\text{AlCl}_3$  and  $\text{FeBr}_3$  are consumed during the EAS reactions, and are really better described as reagents, not catalysts.

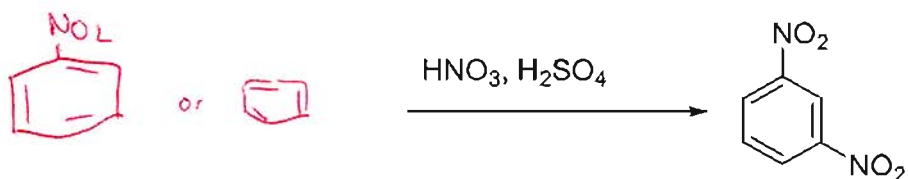
FALSE

11-12) Give the starting materials for the following reactions.

11)

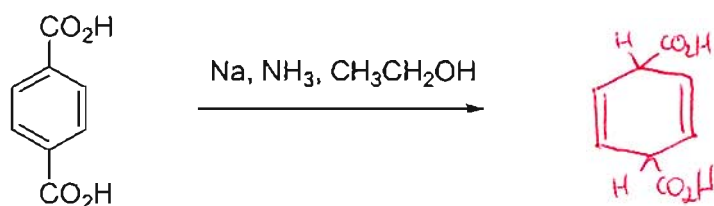


12)

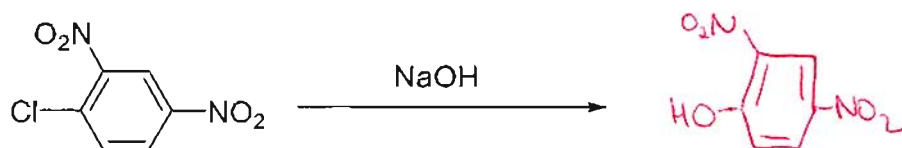


13-14) Draw the products.

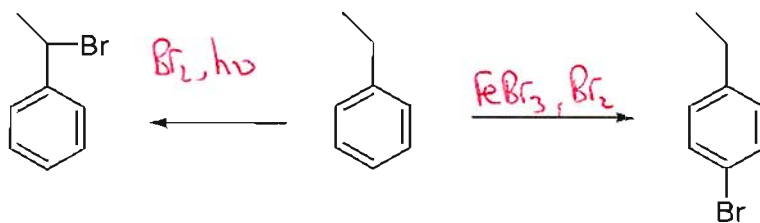
13)



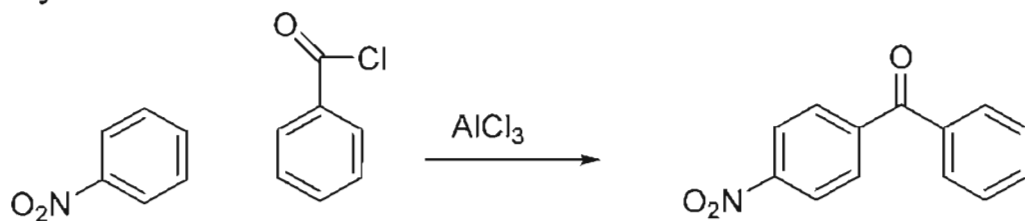
14)



15-16) Give the reagents for both of these substitutions.



17-18) State **two** fundamental problems with the below Friedel Crafts acylation reaction.



- 1) F.C. reactions do not work on deactivated aromatics (like  $\text{C}_6\text{H}_5\text{NO}_2$ )
- 2)  $\text{NO}_2$  group is meta directing, whereas the product is para.

19-20) Bearing in mind that  $-\text{CH}_2\text{CH}_3$  and  $-\text{Br}$  are both ortho/para directors, design a synthetic route for the below transformation.

