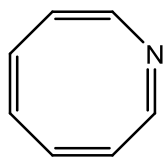
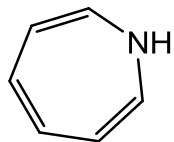


Second practice hour exam, Chemistry 2220, Organic Chemistry II

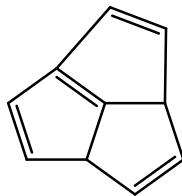
1. Which of the following is aromatic?



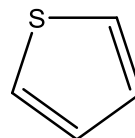
A



B



C

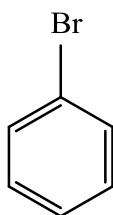


D

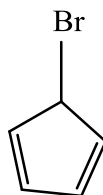
2. Which of the following undergoes an  $S_N1$  reaction (solvolysis) in water most rapidly?



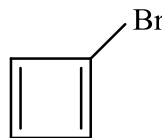
A



B

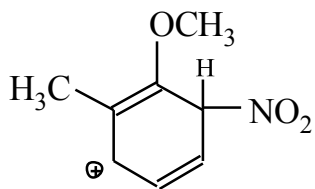


C

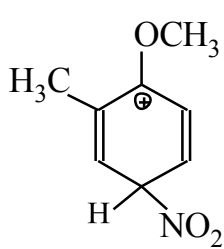


D

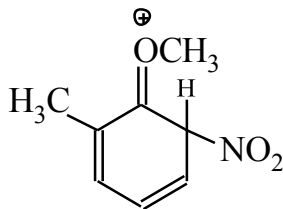
3. Which of the following is **NOT** an intermediate in electrophilic aromatic nitration of *ortho*-methyl anisole?



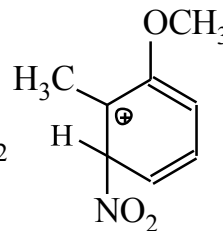
A.



B.

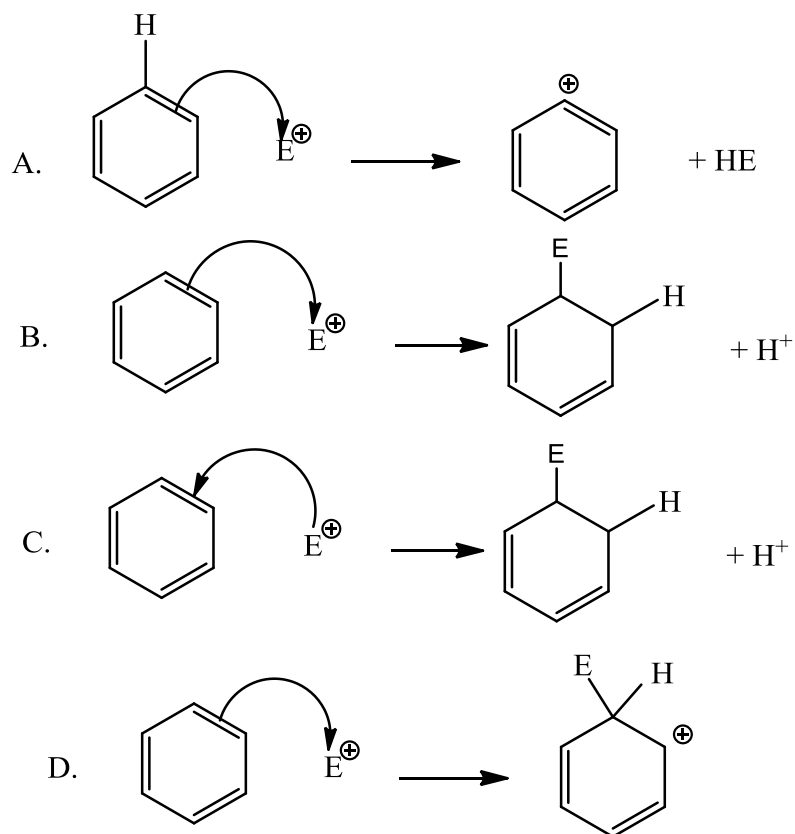


C.

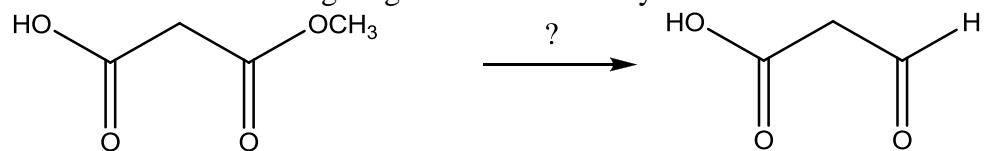


D.

4. Which of the following is likely to be the first step in the general mechanism for electrophilic aromatic substitution reactions?



5. Which of the following reagents is used to carry out the transformation shown?



A.  $\text{LiAlH}_4$

B.  $\text{NaBH}_4$

C.  $\text{H}_2/\text{Pt}$

D.  $(i\text{-Bu})_2\text{AlH}$

6. Which of these is the best way to synthesize 2,2-dimethyl-3-hexene?

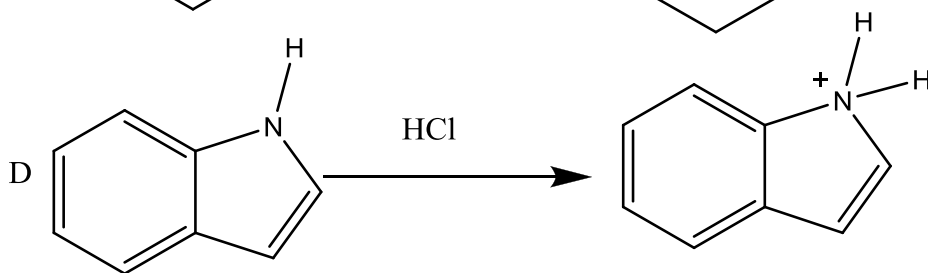
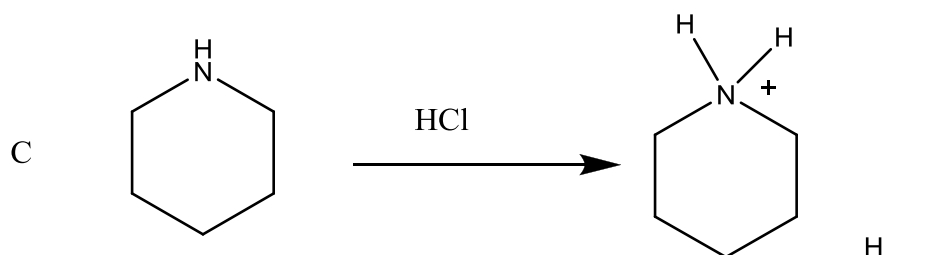
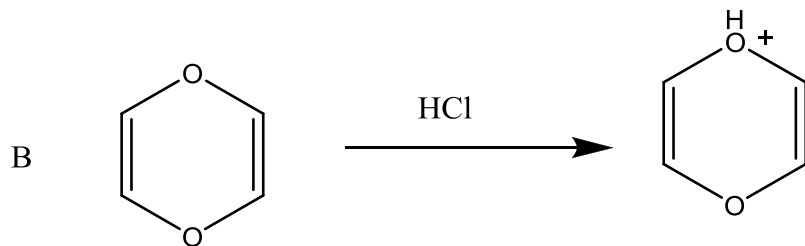
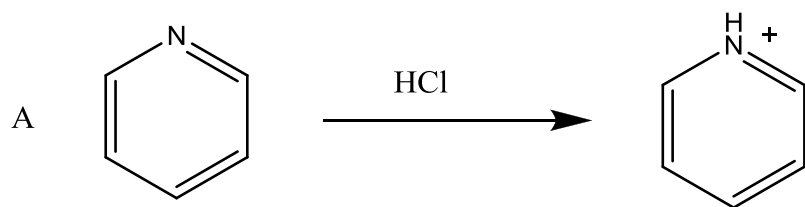
A.  $(\text{CH}_3)_3\text{CCl}$  with  $\text{Ph}_3\text{P}$ , then  $\text{NaNH}_2$ , then butanal

B.  $(\text{CH}_3)_3\text{CCH}_2\text{Cl}$  with  $\text{Ph}_3\text{P}$ , then  $\text{NaNH}_2$ , then propanal

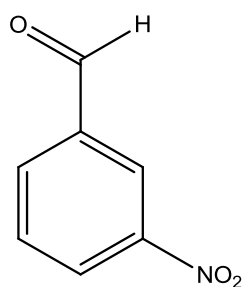
C. *tert*-butyl chloride and butanal with hot  $\text{KMnO}_4$ , heat, hydroxide

D. neopentyl bromide and propanal with  $\text{O}_3$ , then  $\text{CH}_3\text{SCH}_3$

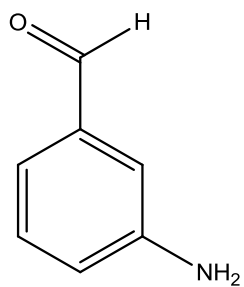
7. Which of the following proceeds the slowest?



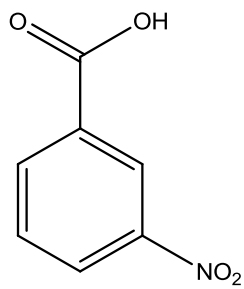
8. Which of the following is *m*-nitrobenzoic acid



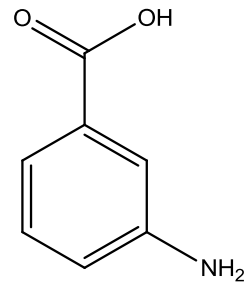
A



B



C

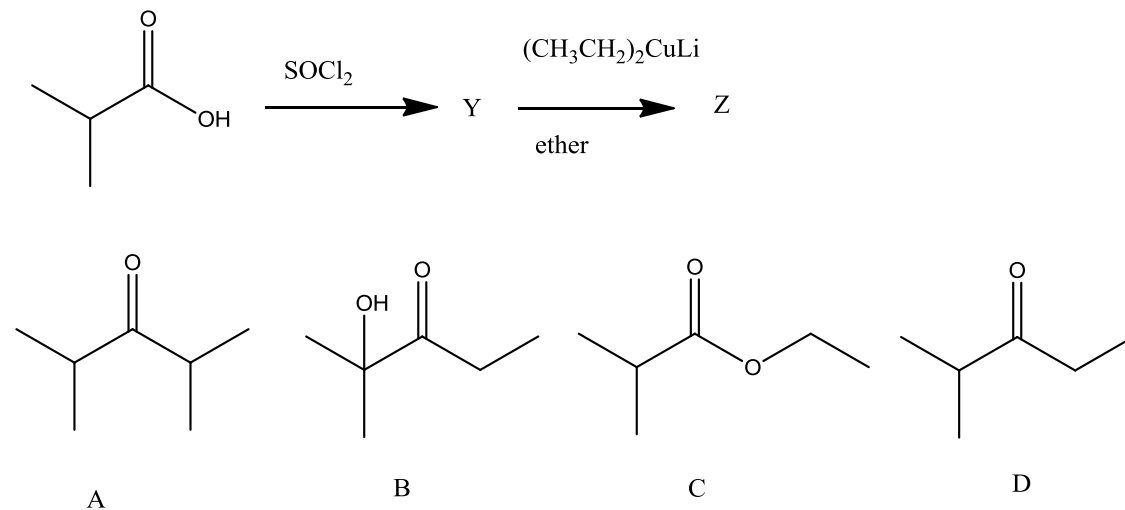


D

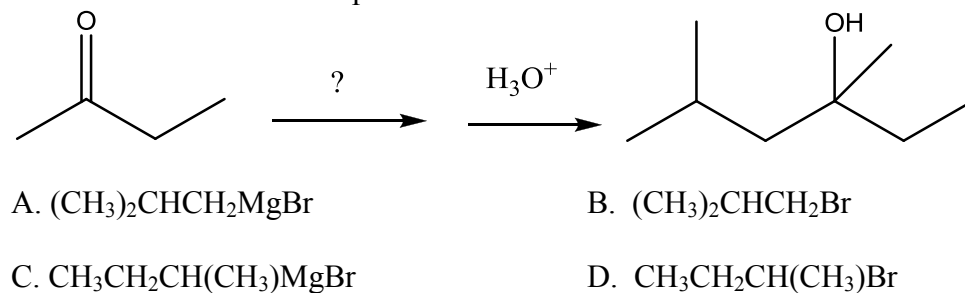
9. What would you use to synthesize toluene from benzaldehyde?

- A.  $\text{H}_2$ , Ni
- B.  $\text{KMnO}_4$ , hydroxide, heat
- C.  $\text{Zn}(\text{Hg})$ ,  $\text{HCl}$
- D.  $\text{NaBH}_4$

10. The product Z of the following reaction series is



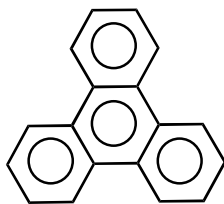
11. What is needed to complete this reaction?



12. What is the IUPAC name of this compound?  $\text{HC}\equiv\text{CCH}_2\text{CH}_2\text{CH}=\text{O}$

- A. 4-pentynal
- B. 4-pentynone
- C. 1-pentyn-5-al
- D. 1-pentyn-5-one

13. How many double bonds are present in a resonance structure of triphenylene?



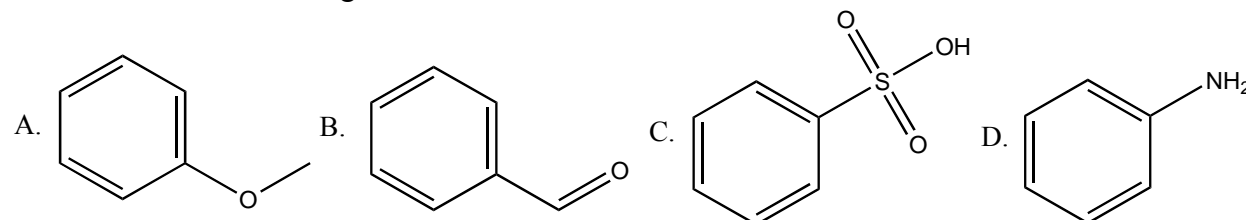
A. 6

B. 7

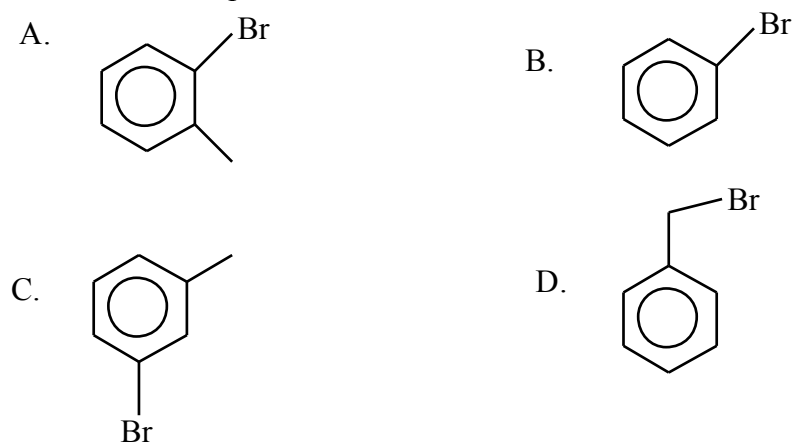
C. 8

D. 9

14. Which of the following is the structure of aniline?



15. Which is the product of the reaction between toluene and bromine in presence of  $\text{FeBr}_3$ ?



16. Which of these is the best way to synthesize *meta*-nitrobenzoic acid from benzene?

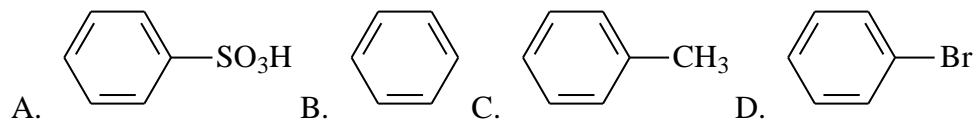
- A.  $\text{HNO}_3/\text{H}_2\text{SO}_4$ , then  $\text{CH}_3\text{Cl}/\text{AlCl}_3$ , then hot  $\text{KMnO}_4$
- B.  $\text{HNO}_3/\text{H}_2\text{SO}_4$ , then  $\text{CH}_3\text{C}(=\text{O})\text{Cl}/\text{AlCl}_3$ , then hot  $\text{KMnO}_4$
- C.  $\text{CH}_3\text{Cl}/\text{AlCl}_3$ , then  $\text{HNO}_3/\text{H}_2\text{SO}_4$ , then hot  $\text{KMnO}_4$
- D.  $\text{CH}_3\text{C}(=\text{O})\text{Cl}/\text{AlCl}_3$ , then hot  $\text{KMnO}_4$ , then  $\text{HNO}_3/\text{H}_2\text{SO}_4$



21. Which of the following is the electrophile in the electrophilic aromatic nitration of benzene?

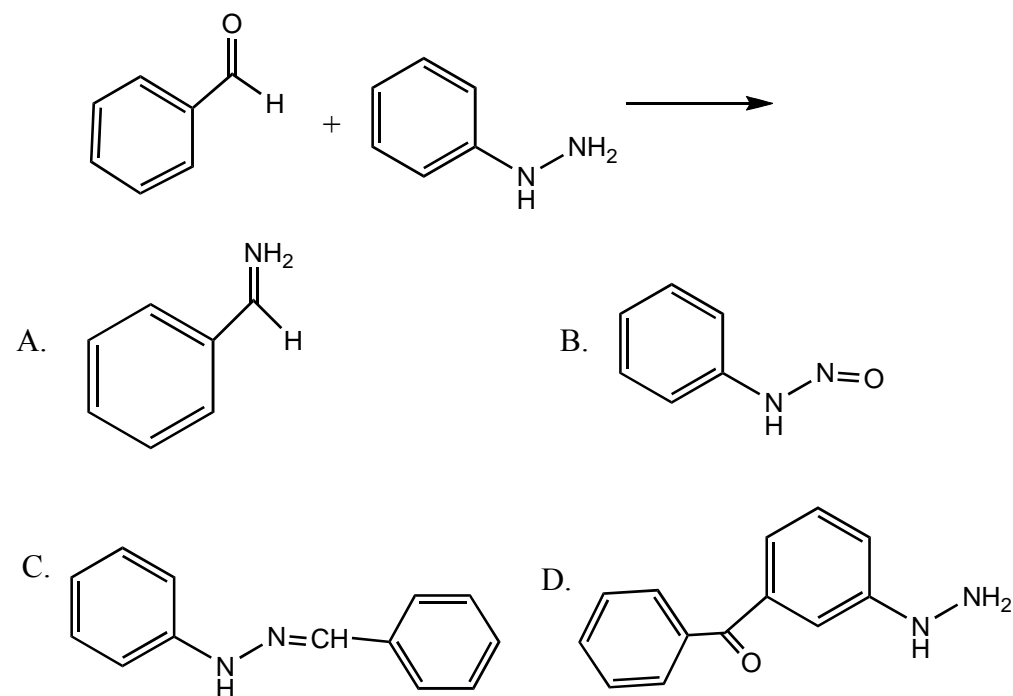
- A.  $\text{NO}_3^-$       B.  $\text{NO}_2^+$       C.  $\text{N}_2$       D.  $\text{NH}_3$

22. Which of these compounds gives the slowest reaction (including no reaction) with  $\text{CH}_3\text{Cl}/\text{AlCl}_3$ ?



23. omit

24. Identify the major product of the following reaction:



25. Which of these procedures does not form a ketone as the final product?

- A. Corey-House reaction of an acid chloride + lithium dialkyl cuprate  
B. Hydration of an alkyne  
C. Friedel-Crafts acylation  
D. Oxidation of a tertiary alcohol