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Organic Chemistry II Drill (CHEM2220D). Practice Hour Exam 2.

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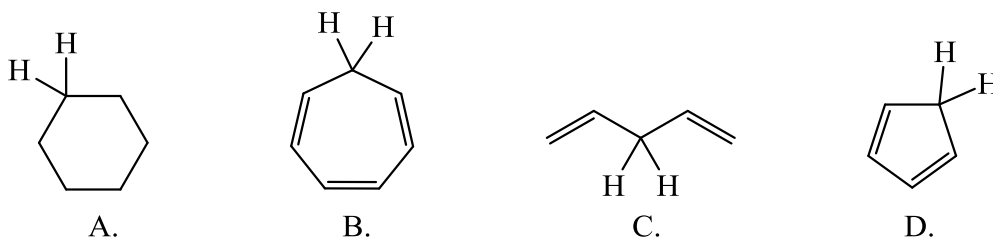
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Practice Hour Exam 2, Chemistry 2220, Organic Chemistry II

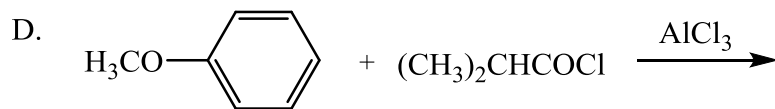
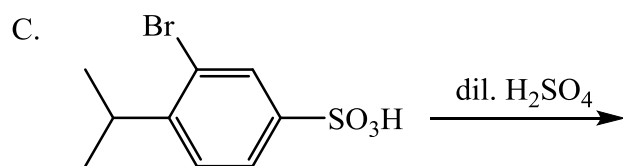
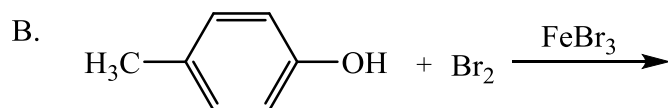
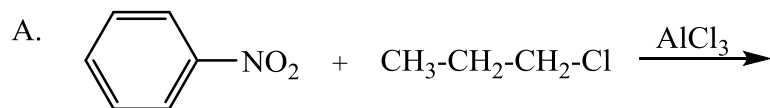
1. How many **different** resonance structures can you draw for the cyclopentadienyl carbocation?

- A. 5 B. 4 C. 3 D. 2

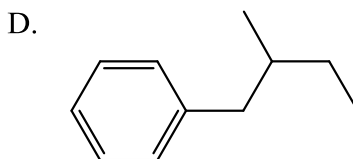
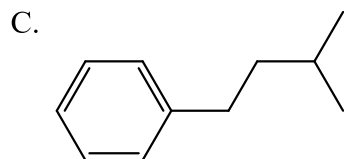
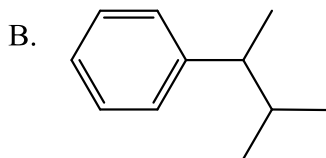
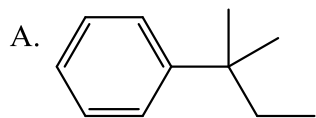
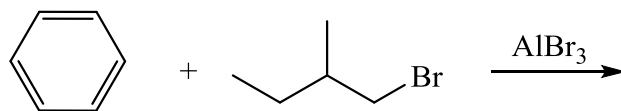
2. Which of the following hydrogens is **MOST** acidic?



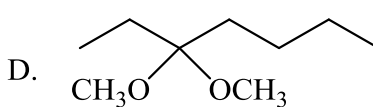
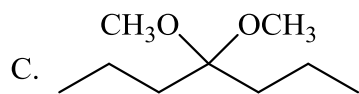
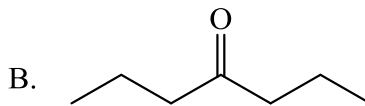
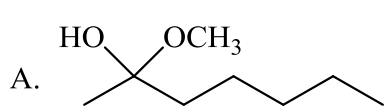
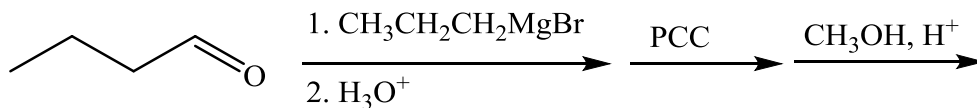
3. Which of the following will give no reaction?



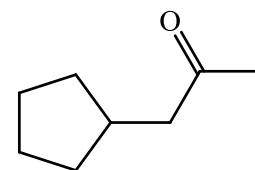
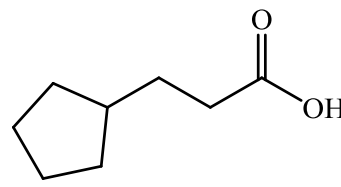
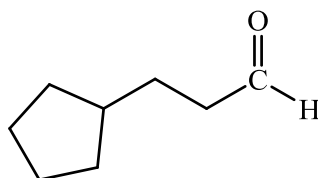
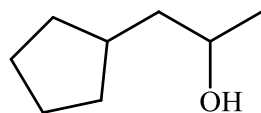
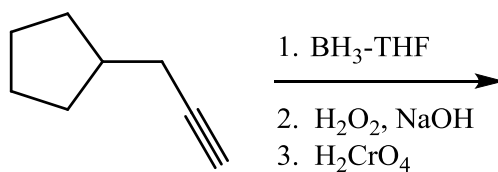
4. Which of the following is the major product of the reaction below?



5. What is the product of this reaction?



6. Predict the product for the following reaction.



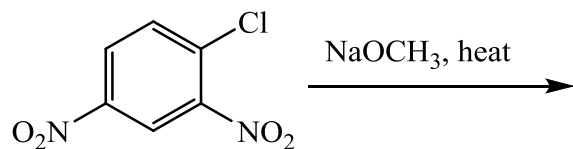
A.

B.

C.

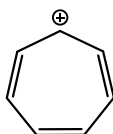
D.

7. The mechanism of this reaction is:



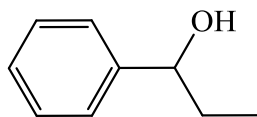
- A. Nucleophilic addition, then elimination ($\text{S}_{\text{N}}\text{Ar}$)
- B. Elimination to a benzyne, then nucleophilic addition
- C. Electrophilic aromatic substitution
- D. Acid-base

8. Which is the correct pi orbital energy level diagram for the following compound?



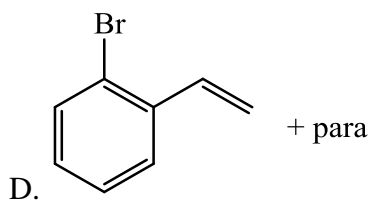
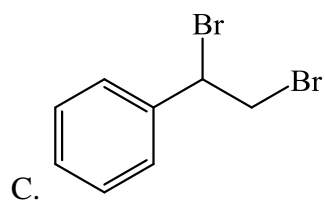
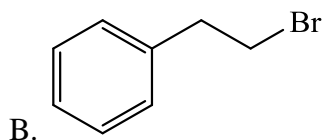
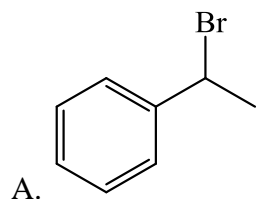
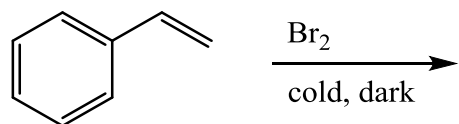
- A.
- B.
- C.
- D.

9. Which of the following is the correct synthesis of the compound shown, from benzene?

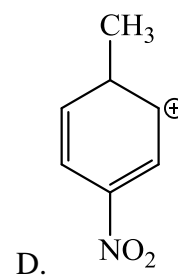
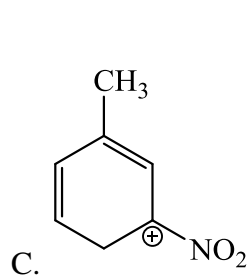
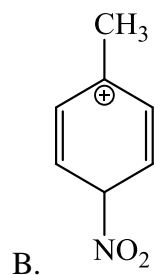
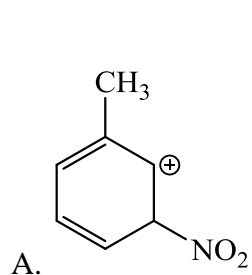


- A. 1. $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}/\text{AlCl}_3$; 2. NBS/light; 3. KOH/heat
- B. 1. $\text{Br}_2/\text{FeBr}_3$; 2. Mg/ether; 3. propanal; 4. H_3O^+
- C. 1. $\text{CH}_3\text{CH}_2\text{COCl}/\text{AlCl}_3$; 2. Zn(Hg)/HCl, heat
- D. 1. $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}/\text{AlCl}_3$; 2. Br_2/heat ; 3. KOH/heat; 4. $\text{BH}_3\text{-THF}$; 5. $\text{H}_2\text{O}_2, ^-\text{OH}$

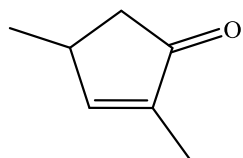
10. What is/are the major product(s) for the following reaction?



11. Which is the most stable resonance structure in the mechanism of the nitration of toluene?



12. What is the IUPAC name for the following compound?



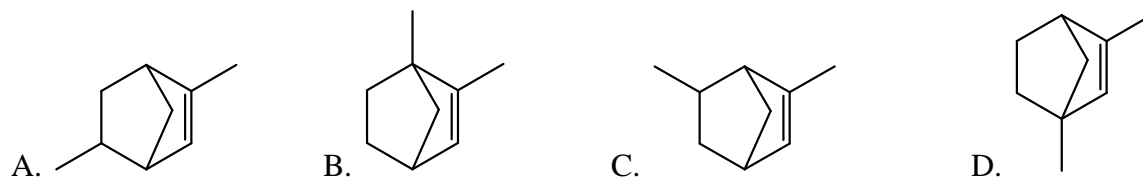
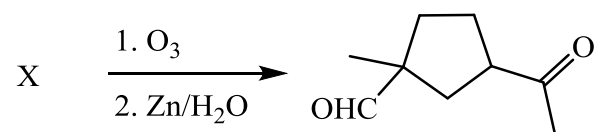
A. 2,5-dimethylpenten-3-one

B. 2,4-dimethyl-2-cyclopentenone

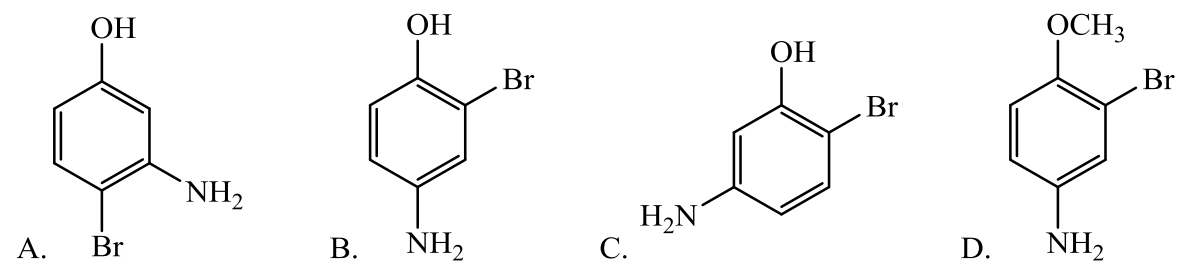
C. 2,5-dimethylcyclopenten-3-one

D. 2,4-dimethyl-3-cyclopentenone

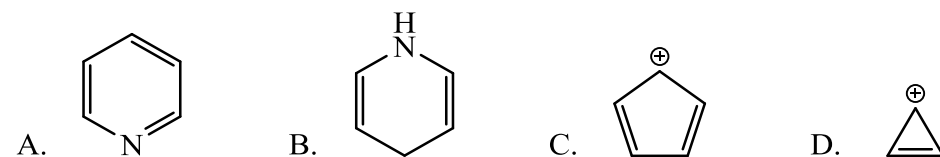
13. Compound X yields the following ozonolysis product. What is the structure of compound X?



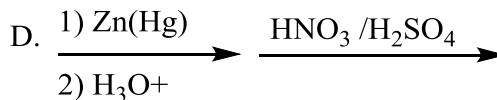
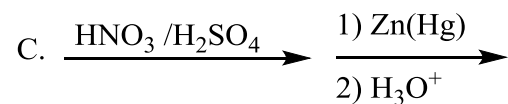
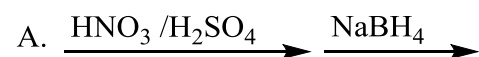
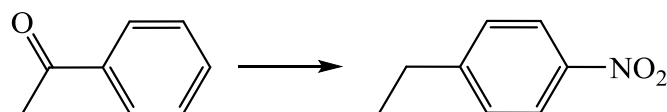
14. What is the structure for 4-amino-2-bromophenol?



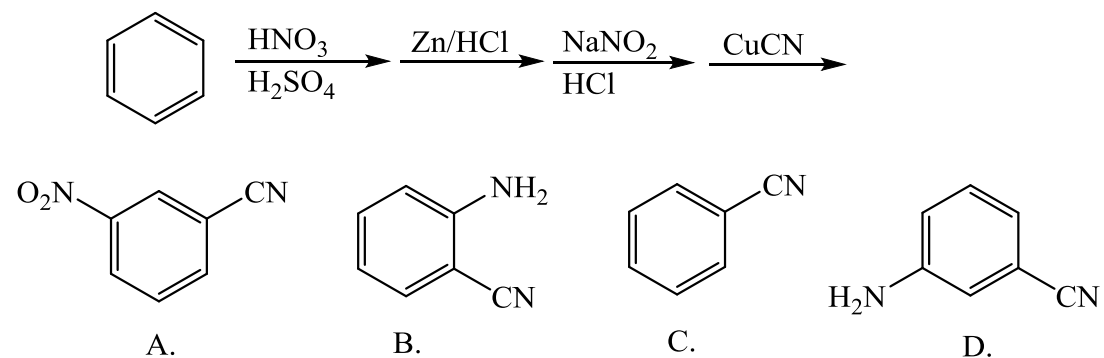
15. Which one of the following compound is nonaromatic (neither aromatic nor antiaromatic)?



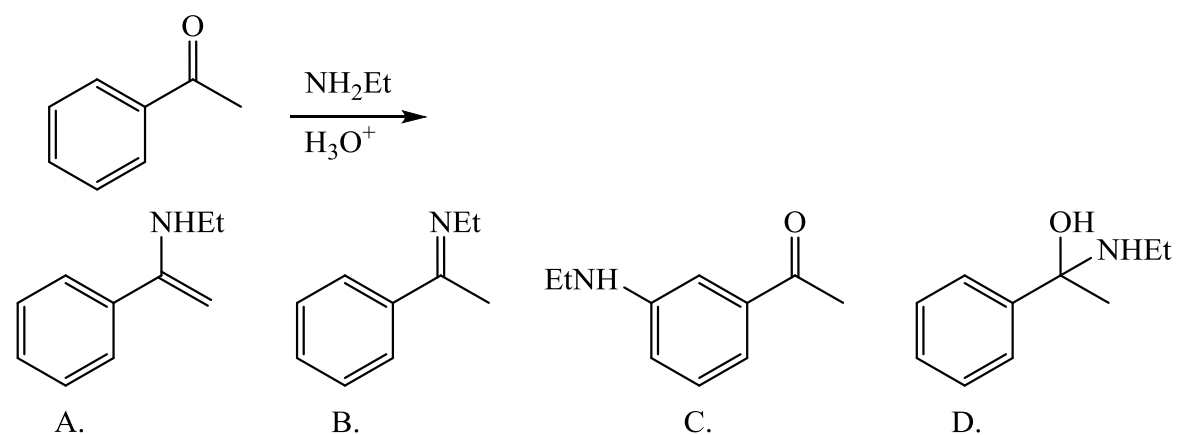
16. Provide the reagents necessary to carry out the following conversion.



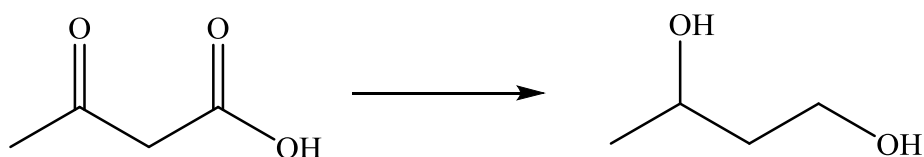
17. What is the product of the following series of reactions?



18. Predict the product of the following reaction:

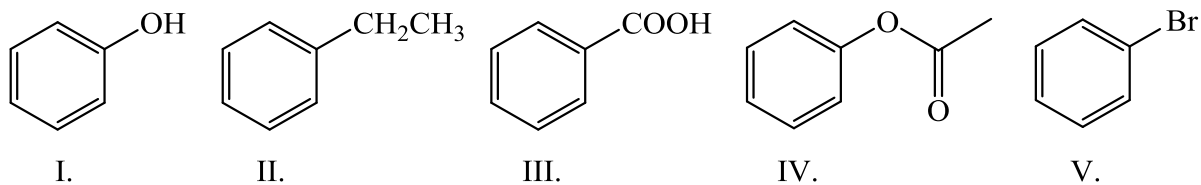


19. How would you accomplish the following transformation?



- A. NaBH_4
 B. 1) LiAlH_4 2) H_3O^+
 C. 1) ethylene glycol, H_3O^+ 2) NaBH_4 3) H_3O^+
 D. 1) ethylene glycol, H_3O^+ 2) LiAlH_4 3) H_3O^+

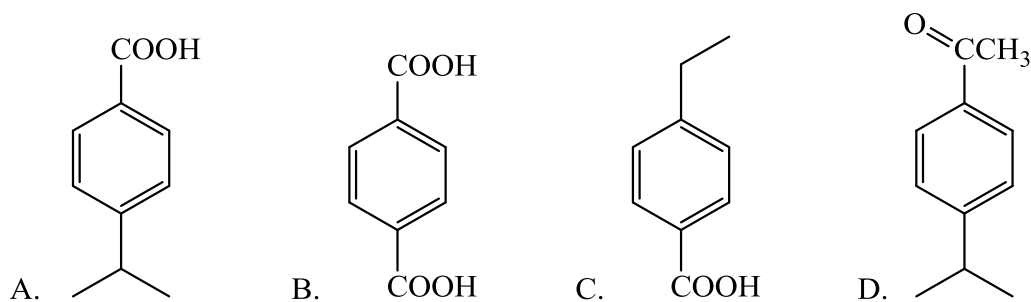
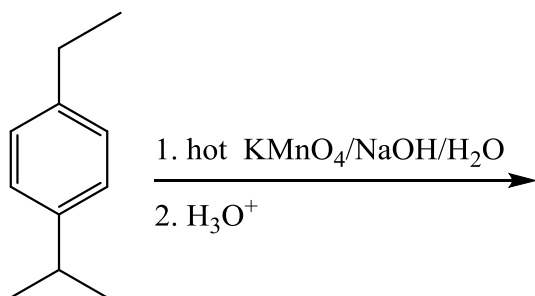
20. Rank these compounds from fastest to slowest as they react in an EAS with $\text{Br}_2/\text{FeBr}_3$.



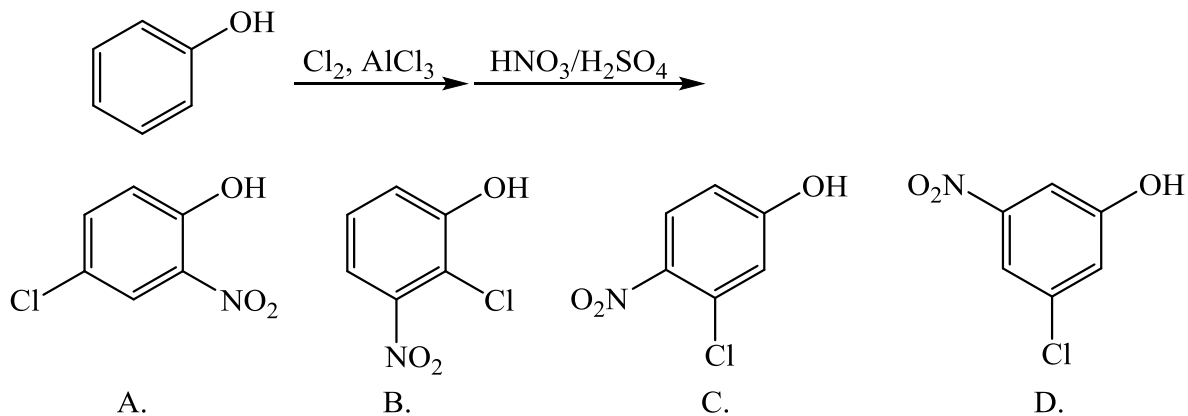
A. III > V > II > I > IV
 C. IV > III > V > II > I

B. I > IV > II > V > III
 D. I > IV > III > V > II

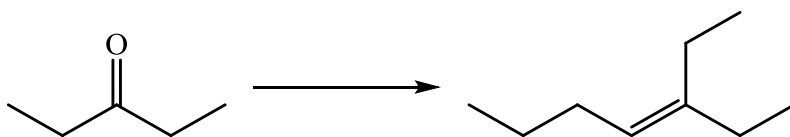
21. Predict the product of this reaction.



22. Which product will be produced in greatest yield?



23. Provide the structure of the ylide needed to prepare 3-ethyl-3-heptene from 3-pentanone using a Wittig reaction.



- A. $\text{Ph}_3\text{P}=\text{C}(\text{CH}_2\text{CH}_3)_2$
- B. $\text{Ph}_3\text{P}=\text{CHCH}_2\text{CH}_3$
- C. $\text{Ph}_3\text{P}=\text{CHCH}_2\text{CH}_2\text{CH}_3$
- D. $\text{Ph}_3\text{P}=\text{C}(\text{CH}_3)_2$

24. Which of these statements is false, comparing benzene with 1,3,5-hexatriene?

- A. Benzene has the longest carbon-carbon bonds.
- B. Benzene releases less energy on hydrogenation.
- C. Benzene protons appear at $\sim 7\text{ppm}$ in the ^1H NMR spectrum.
- D. 1,3,5-hexatriene reacts easily with Br_2 when cold/dark.

25. Which of these structures is not an intermediate in the acid-catalyzed reaction of acetone + methanol to produce an acetal?

