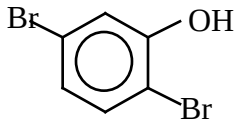
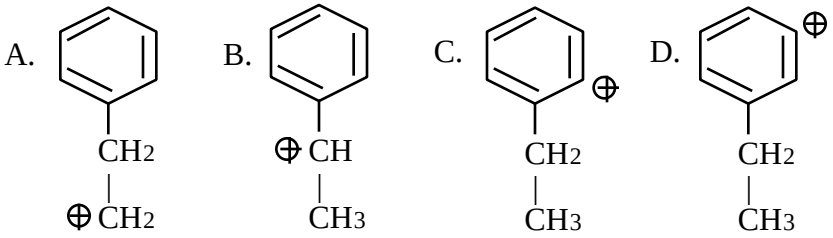
ORGANIC CHEMISTRY 2220 -- SECOND REVIEW EXAMINATION -- APRIL 2001 *A*

1. The name of the compound shown is:

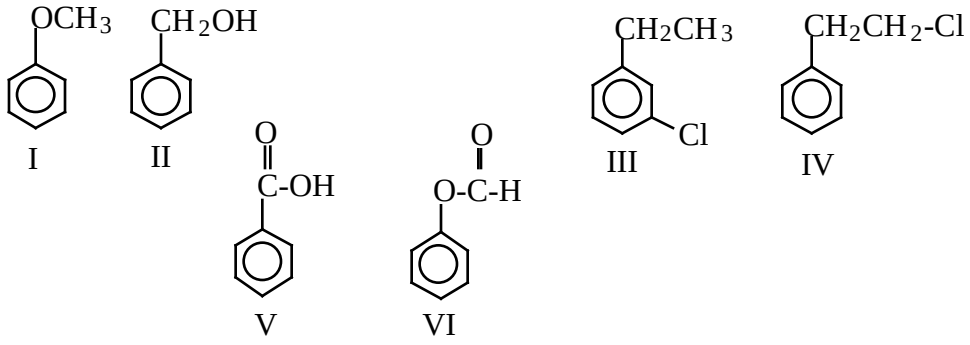


A. 3,4-dibromophenol
B. 2,4-dibromophenol
C. 2,5-dibromophenol
D. 3,6-dibromophenol

2. Which of the following carbocations is the MOST stable?

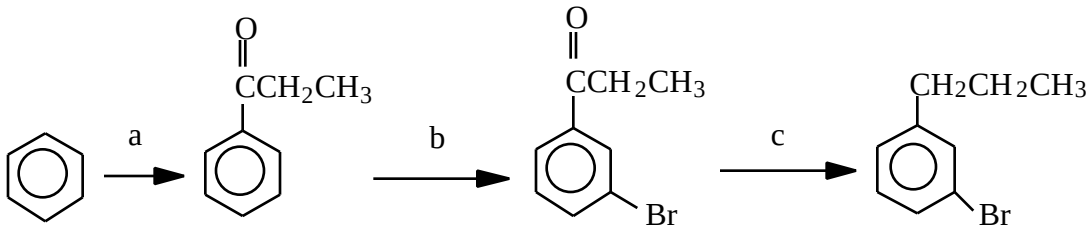


3. For each of the following pairs, which compound would more easily undergo mononitration in a competition reaction?



A. I, III, VI B. II, IV, V C. II, III, V D. I, IV, VI

4. Consider the following reaction scheme:



Which of the sets of reagents listed below would be the most suitable in the above reaction sequence in order to achieve the indicated transformation?

	a	b	c
A.	$CH_3CH_2C(=O)\text{-}Cl$, $AlCl_3$	Br_2, $FeBr_3$	Zn-Hg/HCl
B.	$CH_3CH_2C(=O)\text{-}OH$, $OH^{\ominus}$	Br_2, $FeBr_3$	H_2 /Pd
C.	$CH_3CH_2C(=O)\text{-}Cl$, $AlCl_3$	Br_2, light	H_2O
D.	$CH_3CH_2C(=O)\text{-}OH$, $OH^{\ominus}$	Br_2, light	$LiAlH_4$

5. Which of the following reactions gives a product that, in turn, gives both a positive 2,4-dinitophenylhydrazine (DNP) test and a positive Tollens' test?

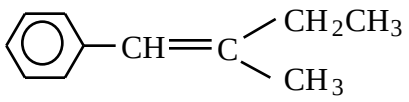
A. $CH_3CH_2OH \xrightarrow{PCC}$

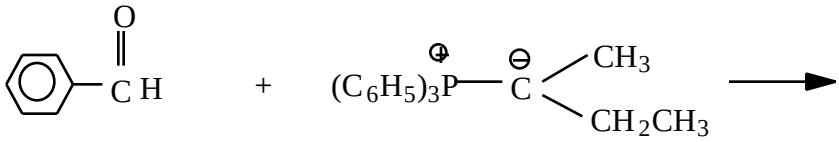
B. $CH_3CH_2OH \xrightarrow{H_2CrO_4}$

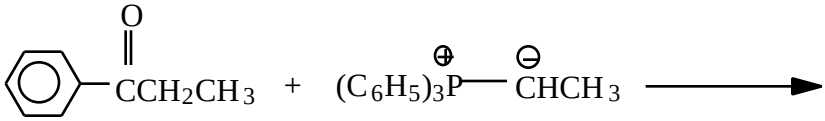
C. $CH_3CH(OH)CH_3 \xrightarrow{PCC}$

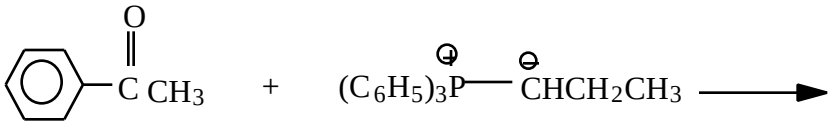
D. $CH_3CH(OH)CH_3 \xrightarrow{H_2CrO_4}$

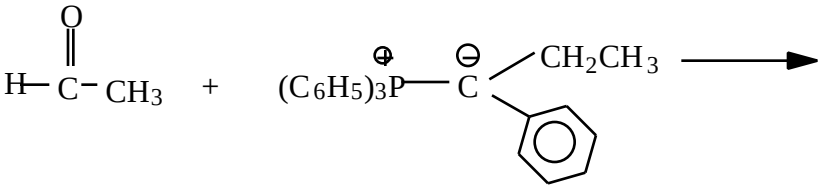
6. Which of the following sets of reactants can be used to make the compound shown?



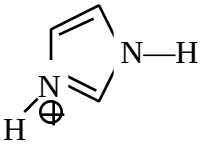
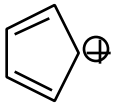
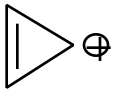
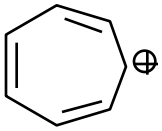
A. 

B. 

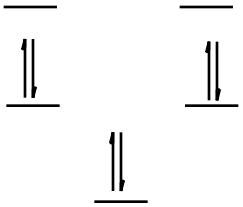
C. 

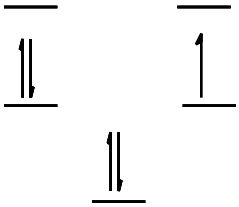
D. 

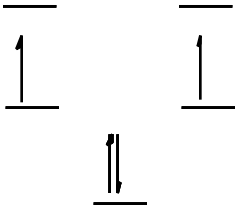
7. Which of the following species is NOT aromatic?

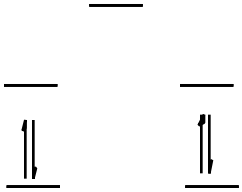
A.  B.  C.  D. 

8. Which of the following is the orbital diagram for cyclopentadienyl cation?

A. 

B. 

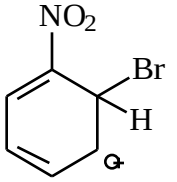
C. 

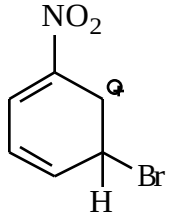
D. 

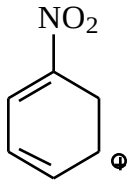
9. Which of the following reaction sequences gives the highest yield of *p*-nitrobenzoic acid from benzene?

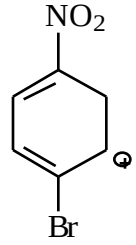
A. HNO_3, H_2SO_4; then $KMnO_4$, OH^-, heat; then H_3O^+; then CH_3I, $AlCl_3$
B. CH_3I, $AlCl_3$; then $KMnO_4$, OH^-, heat; then H_3O^+; then HNO_3, H_2SO_4
C. HNO_3, H_2SO_4; then CH_3I, $AlCl_3$; then $KMnO_4$, OH^-, heat; then H_3O^+
D. CH_3I, $AlCl_3$; then HNO_3, H_2SO_4; then $KMnO_4$, OH^-, heat; then H_3O^+

10. Which of the following species is an intermediate in the bromination of nitrobenzene?

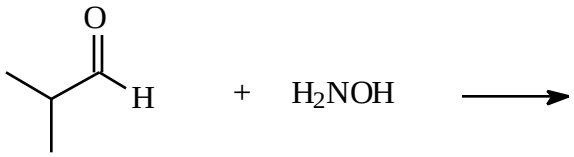
A. 

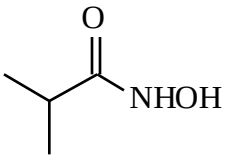
B. 

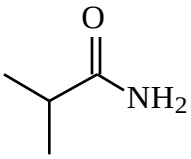
C. 

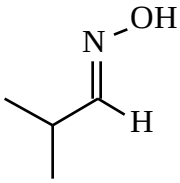
D. 

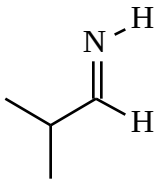
11. What is the product of the following reaction?



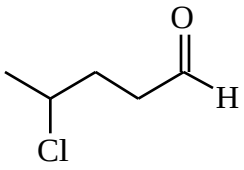
A. 

B. 

C. 

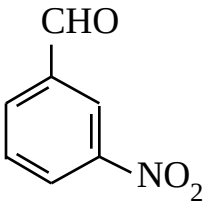
D. 

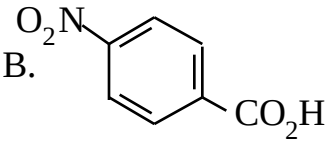
12. What is the name of this compound?

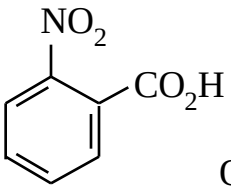


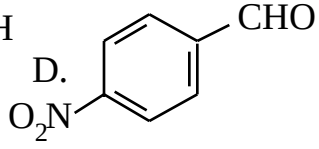
A. 2-chloropentanal
B. 4-chloropentanal
C. 2-chloro-1-pentanone
D. 4-chloro-1-pentanone

13. Which of the following is *p*-nitrobenzaldehyde?

A. 

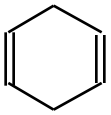
B. 

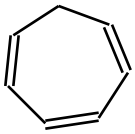
C. 

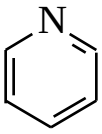
D. 

14. Which of the following does NOT decolorize Br_2/CCl_4 solution?

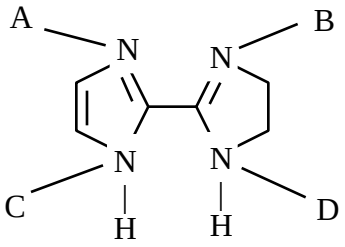
A. 

B. 

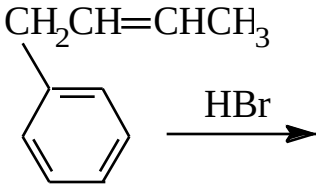
C. 

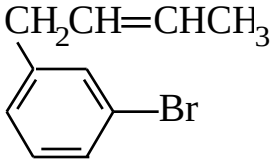
D. 

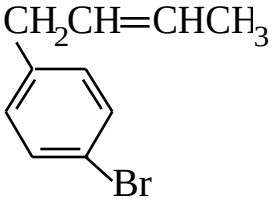
15. Which of the indicated nitrogen atoms is the LEAST basic?

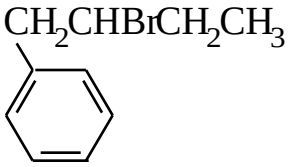


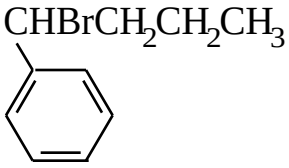
16. What is the major organic product of the reaction below?



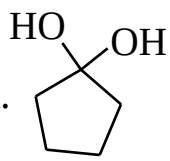
A. 

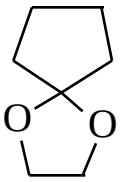
B. 

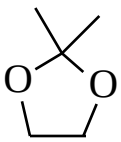
C. 

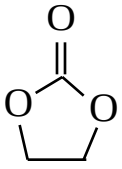
D. 

17. What is the product of the reaction below?

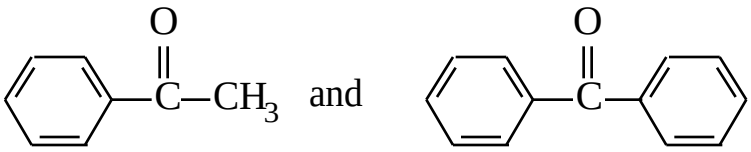
A. 

B. 

C. 

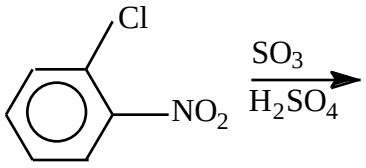
D. 

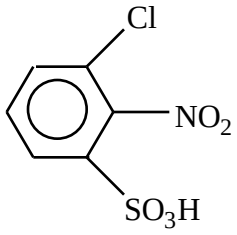
18. Which of the following tests can distinguish between the compounds shown?

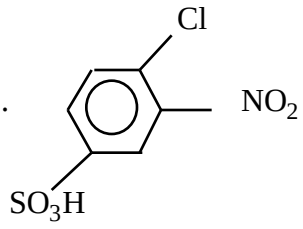


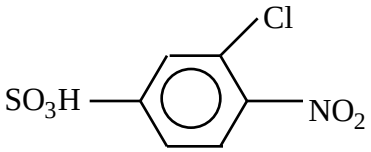
A. DNP test B. Tollen's test C. Jones (chromic acid) test D. Iodoform test

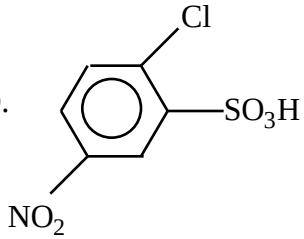
19. Which of these is a major organic product of the following reaction?



A. 

B. 

C. 

D. 

20. An unknown compound having the formula $C_5H_{10}O$ gave a strong peak near 1710 cm^{-1} in its IR spectrum. Its proton nmr spectrum is:

triplet, δ 0.9, 3H
multiplet, δ 1.7, 2H
singlet, δ 2.2, 3H
triplet, δ 2.5, 2H

What is the structure of this unknown?

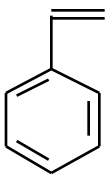
A. $(CH_3)_2CHC(=O)CH_3$

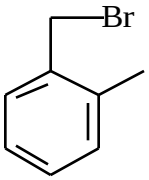
B. $CH_3C(=O)CH_2CH_2CH_3$

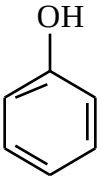
C. $HC(=O)CH_2CH_2CH_2CH_3$

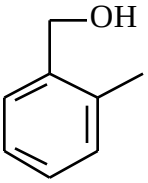
D. $CH_3CH_2CCH_2C(=O)H_3$

21. Which of the following does not decolorize Br_2/CCl_4 and gives a proton NMR spectrum with a multiplet between 7-8 delta for 5 hydrogens?

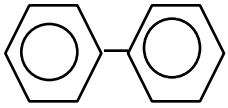
A. 

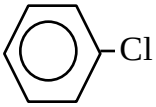
B. 

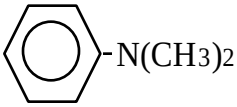
C. 

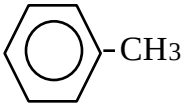
D. 

22. Which of the following compounds reacts MOST SLOWLY with $Cl_2/FeCl_3$?

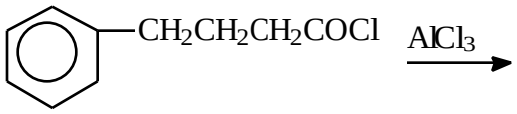
A. 

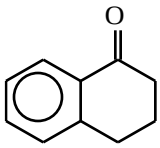
B. 

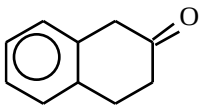
C. 

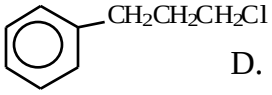
D. 

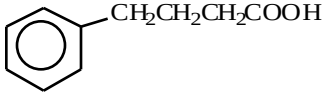
23. What is the product of the following reaction?



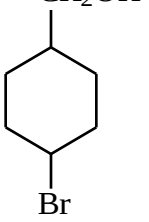
A. 

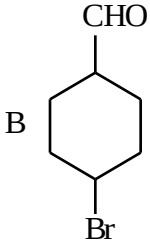
B. 

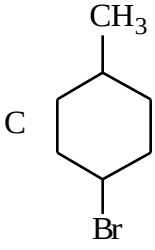
C. 

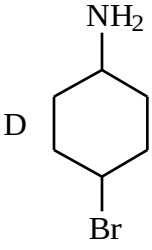
D. 

24. Which of the following has the highest boiling point?

A 

B 

C 

D 

25. Which of the indicated positions reacts MOST RAPIDLY with $Cl_2/FeCl_3$?