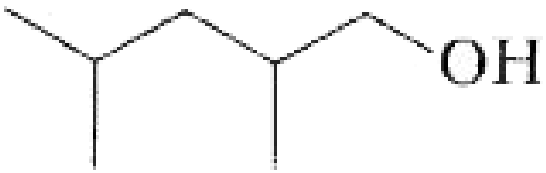
CHEMISTRY

BOOKS - MS CHOUHAN CHEMISTRY (HINGLISH)

ALCOHOLS AND ETHERS

Solved Problem

1. Give IUPAC substitutive names for the following alcohols:



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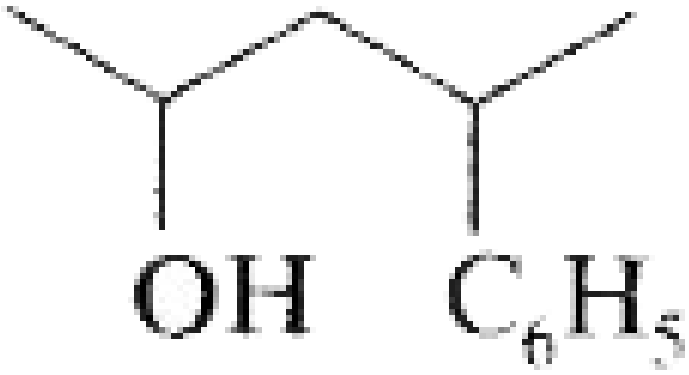
2. Give IUPAC substitutive names for the following alcohols:



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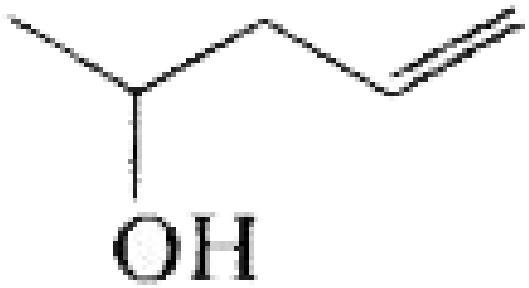
3. Give IUPAC substitutive names for the following alcohols:



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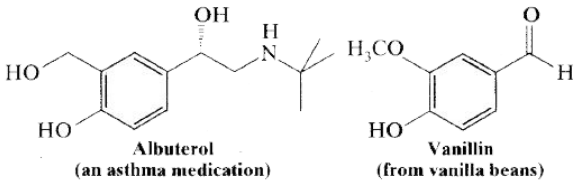
4. Albuterol (used in some commonly prescribed respiratory medications) and vanillin (from vanilla beans) each contain several functional groups. Name the functional groups in albuterol and vanillin and, if appropriate for a given group. classify them as primary (1°), secondary (2°), or tertiary (3°).



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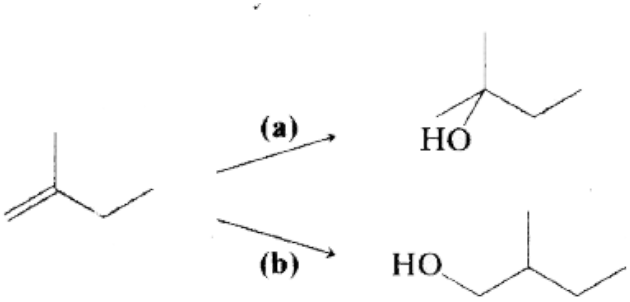
5. What conditions would you use for each reaction?



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6. Treating 3-methyl-2-butanol (see the following reaction) yields 2-bromo-2-

methylbutane as the sole product. Propose a mechanism that explains the course of the reaction.

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7. Give the major product for the reaction

$$CH_3 - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3 \xrightarrow{HBr}$$

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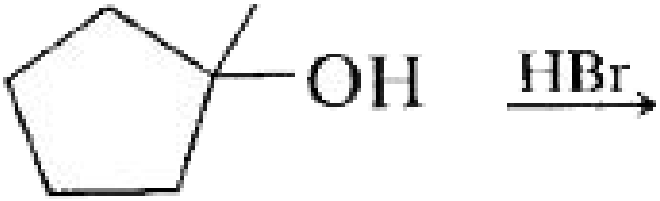
8. Give the major product for the reaction



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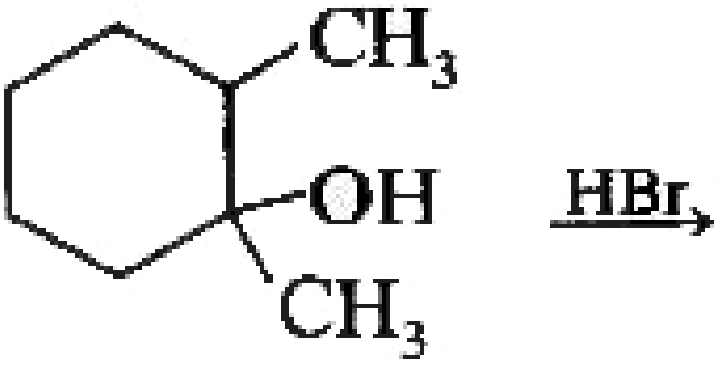
9. Give the major product for the reaction



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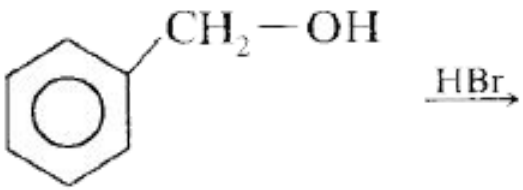
10. Give the major product for the reaction



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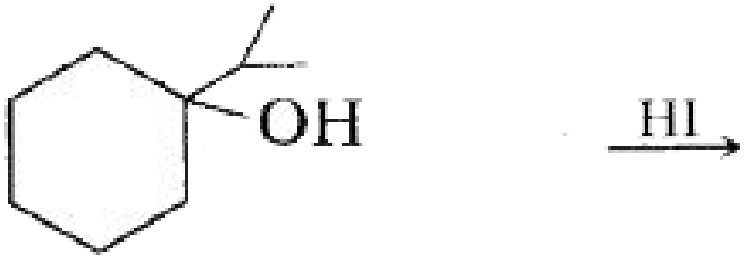
11. Give the major product for the reaction



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12. Starting with alcohol, outline a synthesis of benzyl bromide

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13. Starting with alcohol, outline a synthesis of cyclohexyl chloride

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14. Starting with alcohol, outline a synthesis of butyl bromide

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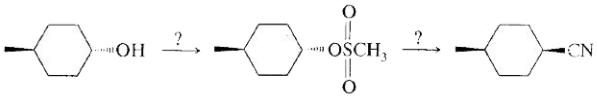
15. Supply the missing reagents.



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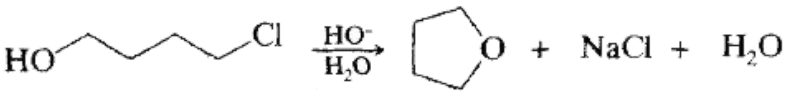
16. The cyclic ether tetrahydrofuran (THF) can be synthesized by treating 4-chloro-1-butanol with aqueous sodium hydroxide (see below). Propose a mechanism for this reaction.



Tetrahydrofuran

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17. Prepare the ethers by Williamson.s ether synthesis

$$CH_3 - O - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - CH_3$$

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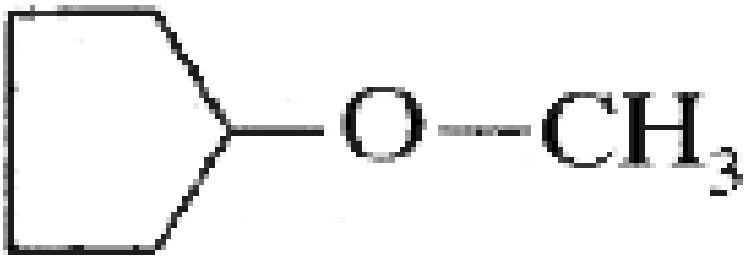

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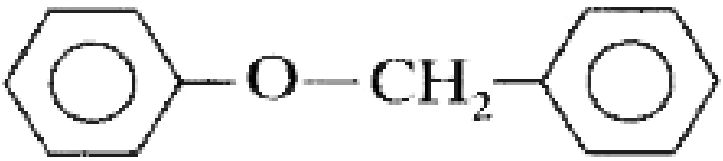
19. Prepare the ethers by Williamson.s ether synthesis



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20. Explain why methyl ethyl ether forms both methyliodide and ethyliodide on being heated with excess of HI?

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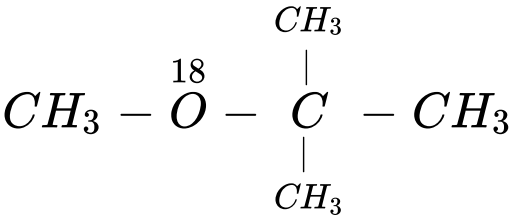
21. Give the major products obtained on heating the ether with one equivalent of HI.



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22. Give the major products obtained on heating the ether with one equivalent of HI.

$CH_3 - \overset{18}{O} - CH_2 - CH_2 - CH_3$

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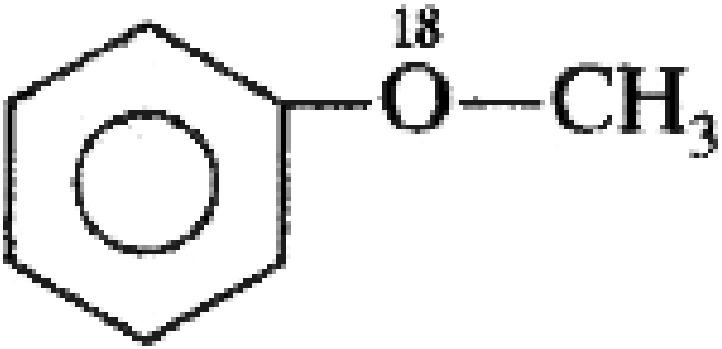
23. Give the major products obtained on heating the ether with one equivalent of HI.



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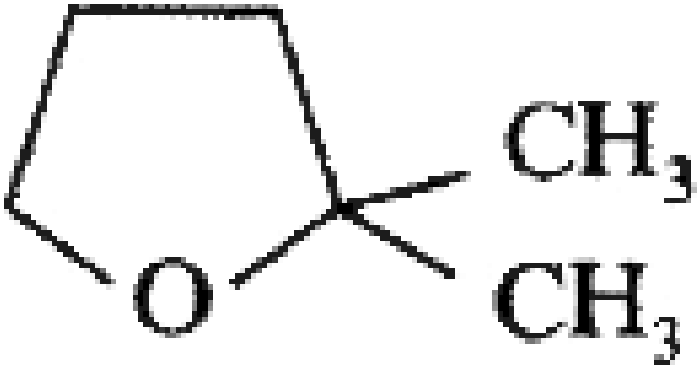
24. Give the major products obtained on heating the ether with one equivalent of HI.



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25. Give the major products obtained on heating the ether with one equivalent of HI.

$CH_3 - CH_2 - O - CH_2 - Ph$

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26. Give the major products obtained on heating the ether with one equivalent of HI.

$CH_3 - CH_2 - O - CH_2 - CH_3$

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27. Suggest reagents for the transformations

$CH_3I \rightarrow CH_3OH$

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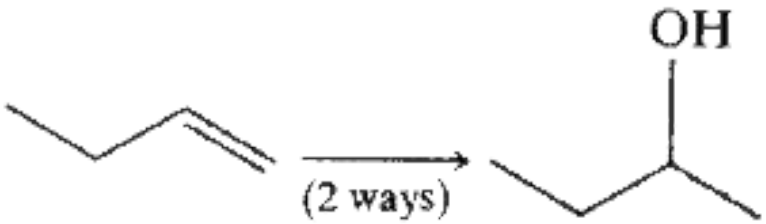
28. Suggest reagents for the transformations



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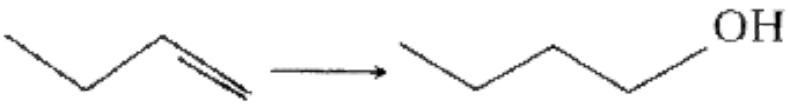
29. Suggest reagents for the transformations



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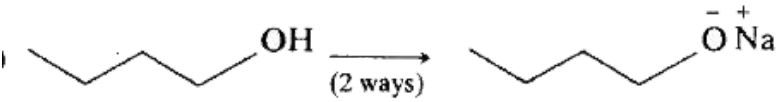
30. Suggest reagents for the transformations



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31. Choose the best synthetic route to $(CH_3)_3COCH_3$ amongst the following:

(a) React $(CH_3)_3COH$ with KOH, then add CH_3I.

(b) React $(CH_3)_3COH$ with NaOH, then add

CH_3I.

(c) React CH_3OH with KOH, then add $(CH_3)_3CI$.

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32. Give the products of the reaction :

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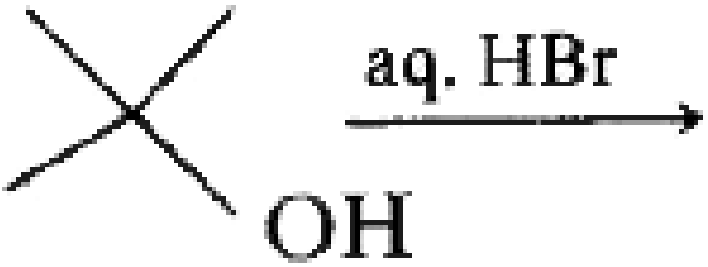
33. Give the products of the reaction :



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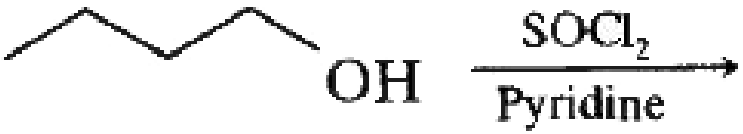
34. Give the products of the reaction :



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35. Give the products of the reaction :

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36. Give the products of the reaction :

$$\text{Product of reaction (d)} \xrightarrow[DMF]{NaCN}$$

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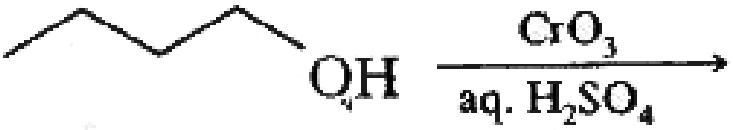
37. Give the products of the reaction :



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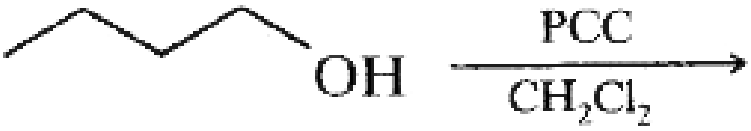
38. Give the products of the reaction :



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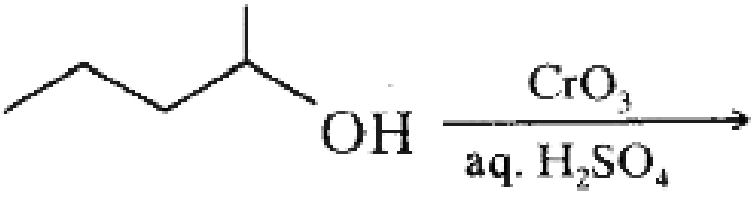
39. Give the products of the reaction :



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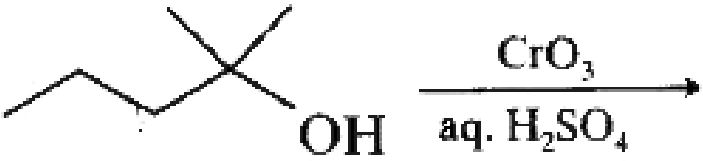
40. Give the products of the reaction :



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41. Give the products of the reaction :

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42. Give the products of the reaction :

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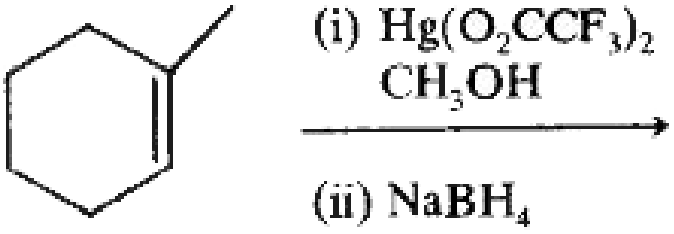
43. Give the products of the reaction :



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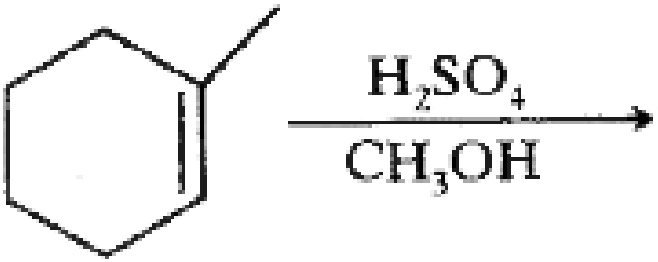
44. Give the products of the reaction :



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45. Why does ethylene oxide react readily with nucleophiles such as ammonia, whereas THF is inert to nucleophilic attack by ammonia?

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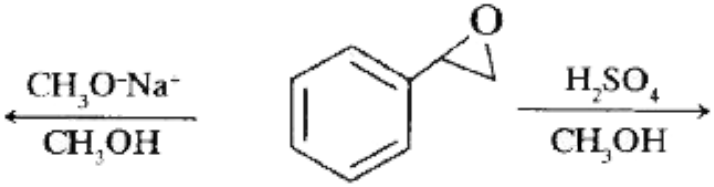
46. Give the products and mechanism for each of the following reactions. Explain why nucleophilic attack on the epoxide occurs at different sites in

the two reactions.



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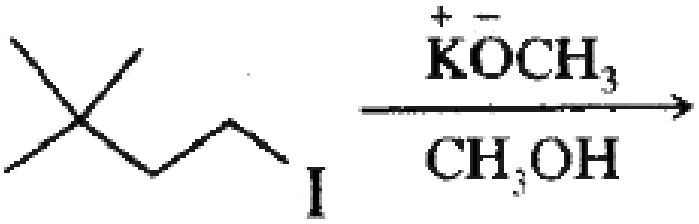
47. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

major product. If no reaction occurs, write "NR"



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48. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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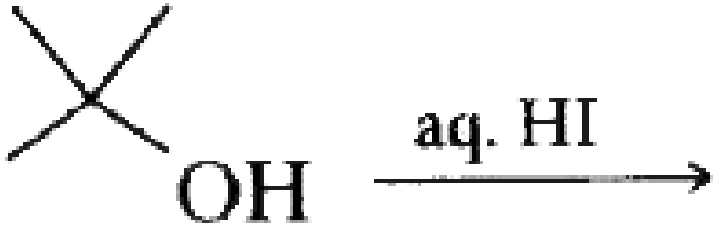

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49. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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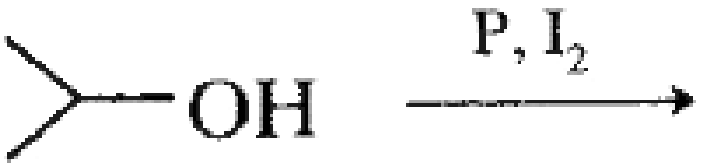

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50. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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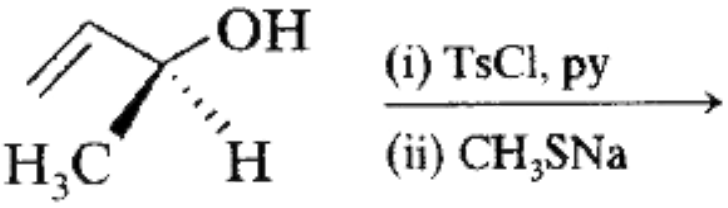

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51. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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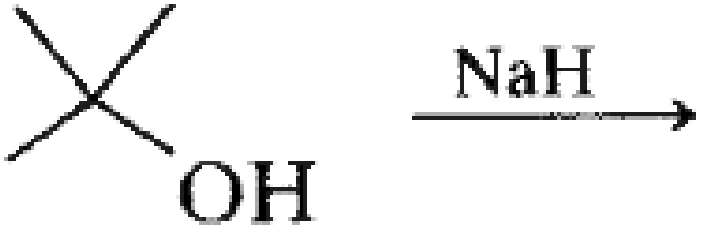

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52. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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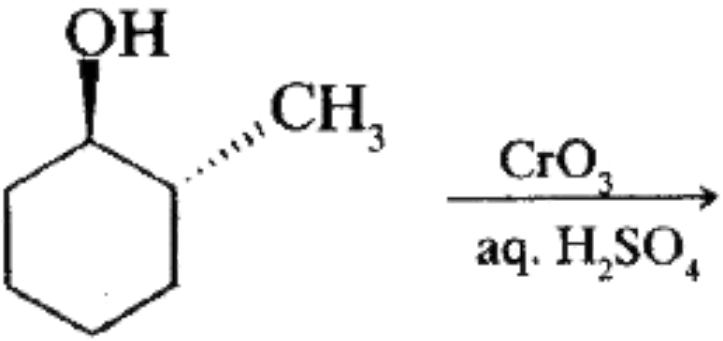

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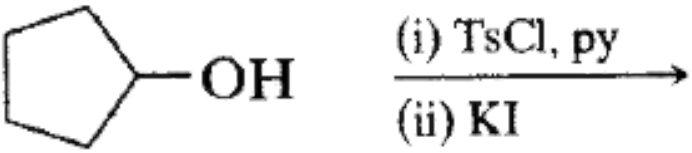

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56. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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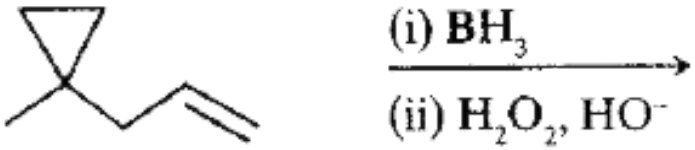

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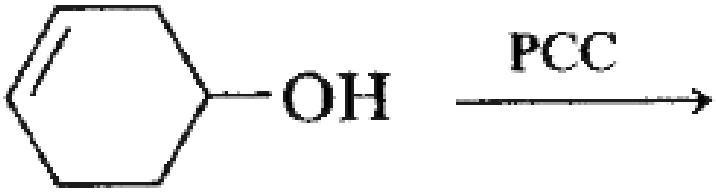

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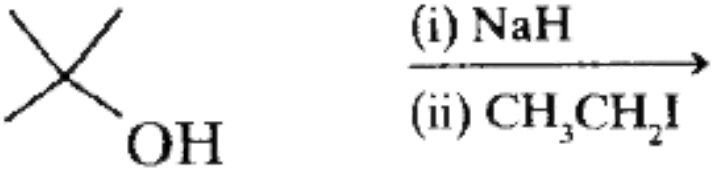

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59. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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View Text Solution

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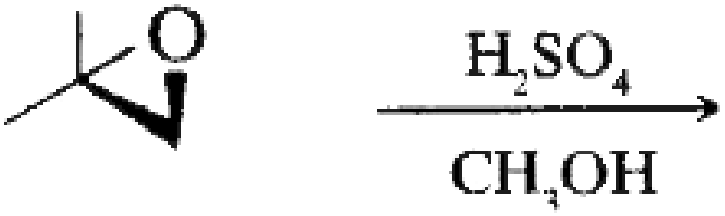

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61. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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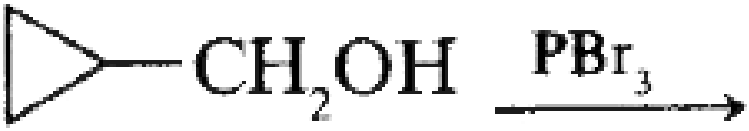

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62. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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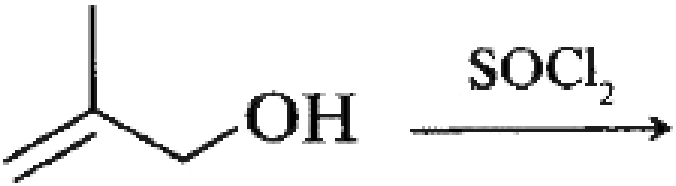

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63. Provide the organic product(s) of the reaction. Pay careful attention to stereochemistry. If more than one product is formed, indicate which product (if any) is the

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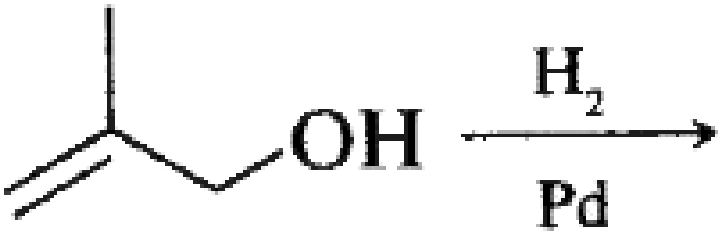

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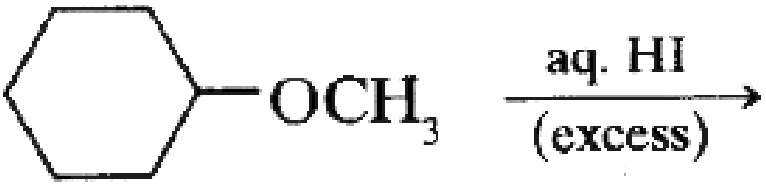

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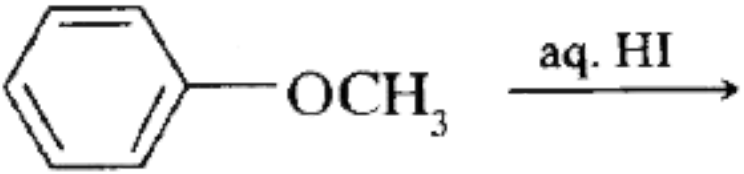

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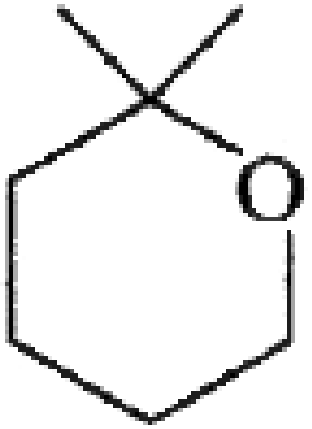
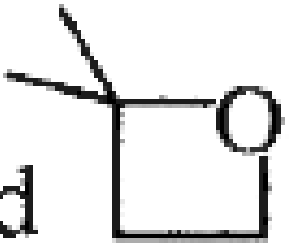
66. Consider the reaction of



and



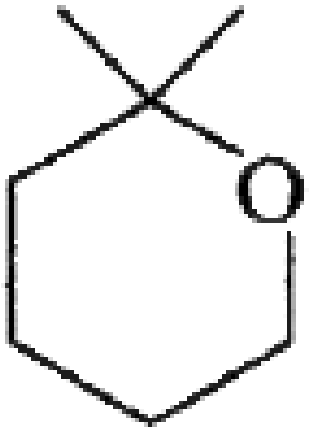
with

aqueous HI.

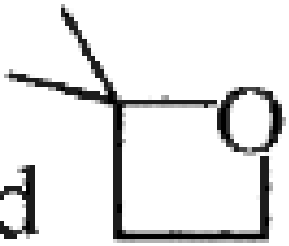
Give the mechanism and product of the faster reaction

View Text Solution

67. Consider the reaction of



and



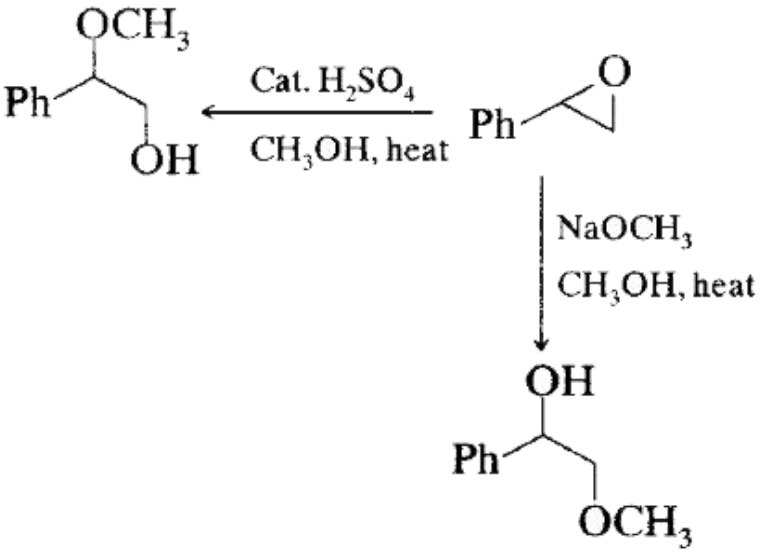
with

aqueous HI.

Explain your choice of the faster reaction.

View Text Solution

68. Explain why following reaction give different products :



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69. Define oxidation and reduction from an organic perspective and give specific examples.

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70. Write the best reagents above each reaction arrow. If the transformation cannot be achieved

in a single step by any reagents, write "NR"

View Text Solution

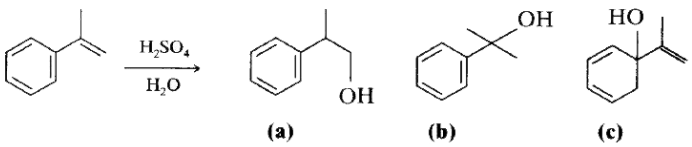
71. Write the best reagents above each reaction arrow. If the transformation cannot be achieved in a single step by any reagents, write "NR"

View Text Solution

72. Write the best reagents above each reaction arrow. If the transformation cannot be achieved in a single step by any reagents, write "NR"

View Text Solution

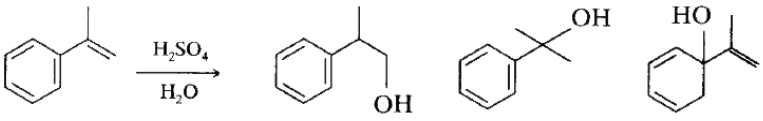
73. Consider the reaction :



Provide a complete mechanism for the formation of the major product.

View Text Solution

74. Consider the reaction :

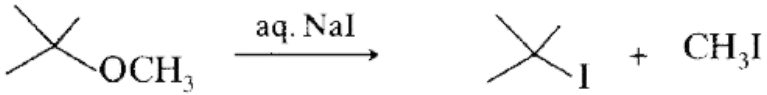


(a) (b) (c)

Briefly explain the choice of major product.

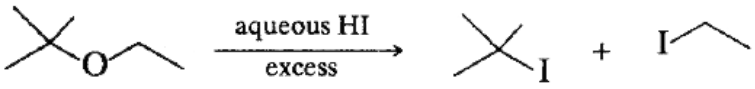
View Text Solution

75. Briefly explain why the following reaction does not occur



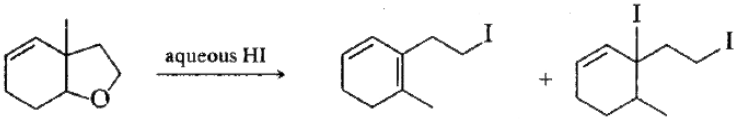
View Text Solution

76. Give the mechanisms of the reaction



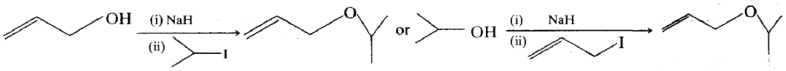
View Text Solution

77. Give the mechanisms of the reaction



View Text Solution

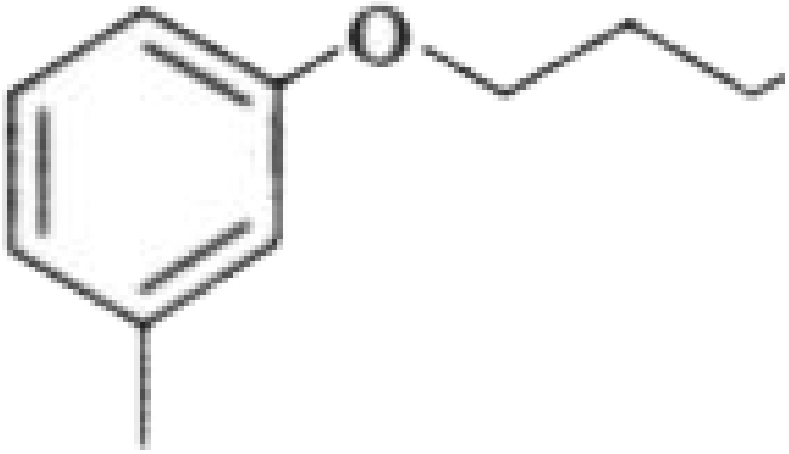
78. Which of the following two routes to allyl isopropyl ether is more efficient? Explain.

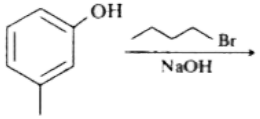


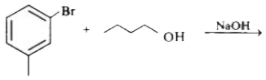
View Text Solution

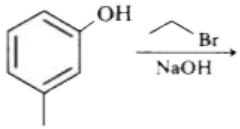
Additional Objective Questions Single Correct Choice Type

1. Which of the following synthetic routes may be employed to prepare the following aryl ether ?



A. 

B. 

C. 

D. Both (a) and (b) will work

Answer: A

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2. The reaction products of

A. $C_6H_5OH + CH_3I$

B. $C_6H_5I + CH_3OH$

C. $C_6H_5CH_3 + HOI$

D. $C_6H_6 + CH_3OI$

Answer: A

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3. The best combination for the preparation of ether Williamson.s synthesis are

A. $(CH_3)_3CBr$ and CH_3ONa

B. $(CH_3)_3CBr$ and CH_3OH

C. CH_3Br and $(CH_3)_3CONa$

D. CH_3Br and $(CH_3)_3COH$

Answer: C

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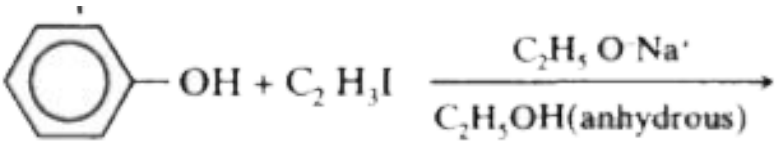
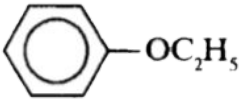
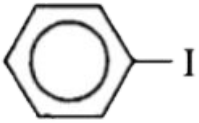
4. The product of the following reactions is



A. 

B. 

C. $C_6H_5OC_6H_5$

D. $C_2H_5OC_2H_5$

Answer: A

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5. When alkyl halide is heated with dry Ag_2O, it produces

A. ester

B. ether

C. ketone

D. alcohol

Answer: B

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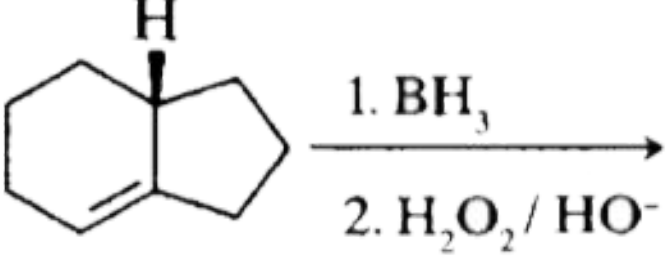
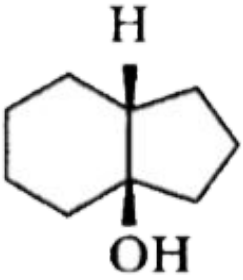
6. Choose the major product of the following reaction



A.



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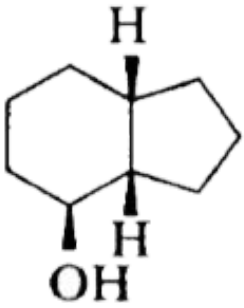
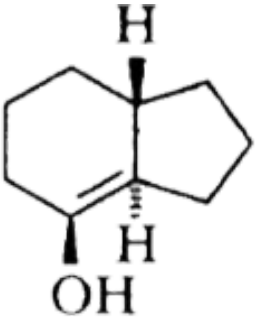
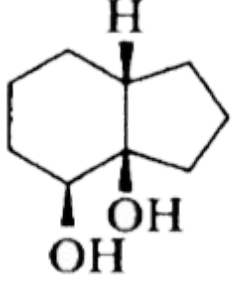


C.

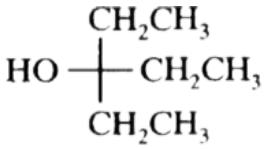


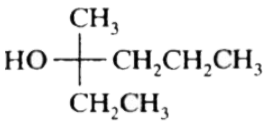
D. 

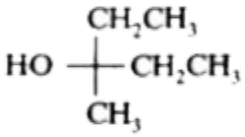
Answer: B

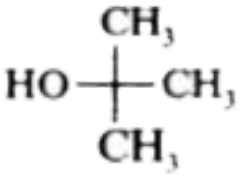
View Text Solution

7. The product of the following reaction is

A. 

B. 

C. 

D. 

Answer: D

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8. Mixed ether is also known as

A. symmetric ethers

B. unsymmeteric ethers

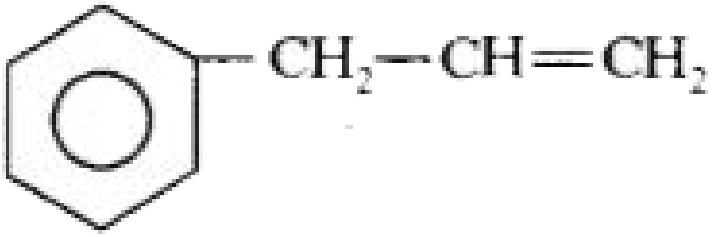
C. dialkyl ethers

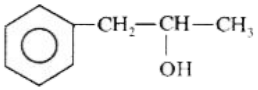
D. oxane

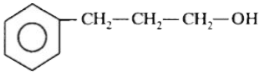
Answer: B

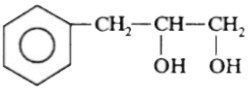
View Text Solution

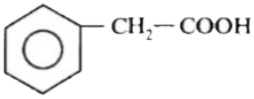
9. The following compound on mercuration demercuration produces the major product



A. 

B. 

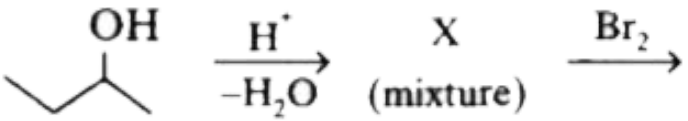
C. 

D. 

Answer: A

View Text Solution

10. The following reaction gives five compounds of molecular formula $C_4H_8Br_2$



The number of compounds in X will be

A. 2

B. 3

C. 4

D. 5

Answer: B

View Text Solution

11. Which set of reagents Is used for the purpose of adding water to an alkene in a Markovnikov addition without rearrangement ?

A. BH_3, THF followed by $H_2O_2, NaOH$

B. $H_2OH_2SO_4$

C. Br_2, H_2O

D. $Hg(O_2CCH_3), H_2O$ followed by $NaBH_4, NaOH$

Answer: D

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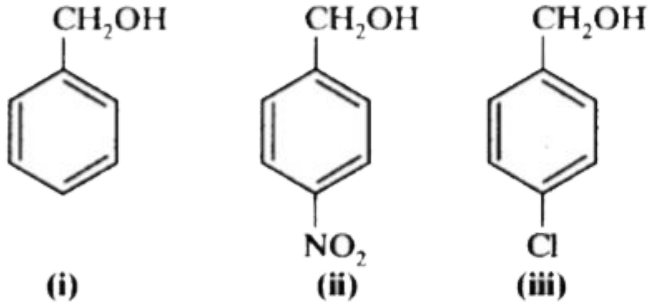
12. Make the correct increasing order of reactivity of following compounds with HBr / HCl



(i) (ii) (iii)

A. $(i) < (ii) < (iii)$

B. $(ii) < (i) < (iii)$

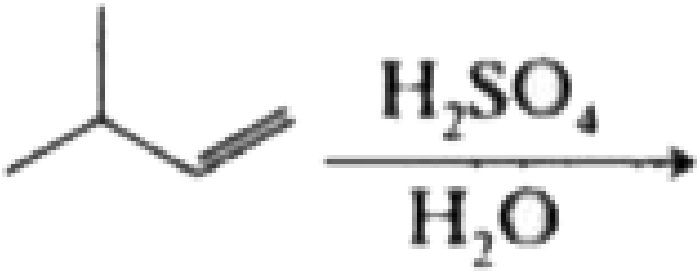
C. $(ii) < (iii) < (i)$

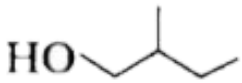
D. $(iii) < (ii) < (i)$

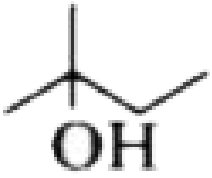
Answer: C

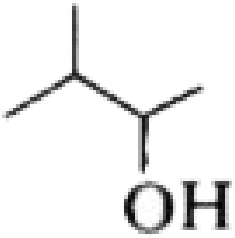
View Text Solution

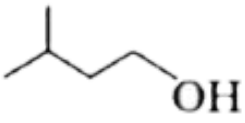
13. What is the major product of the following reaction ?



A. 

B. 

C. 

D. 

Answer: B

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14. When phenyl magnesium bromide reacts with tert-butanol, which of the following product is formed?

A. tert-Butyl methyl ether

B. Benzene

C. tert-Butyl benzene

D. Phenol

Answer: B

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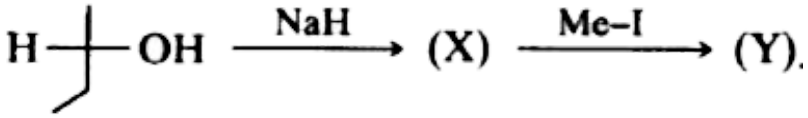
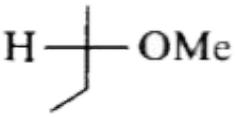
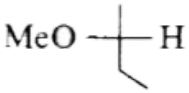
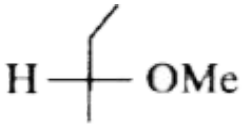
15. 

Identify (Y)

A. 

B. 

C. 

D. None of these

Answer: A

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16. Cyclohexene is best prepared from cyclohexanol by which of the following ?

A. Conc. H_3PO_4

B. Conc. $HCl / ZnCl_2$

C. Conc. HCl

D. Conc. HBr

Answer: A

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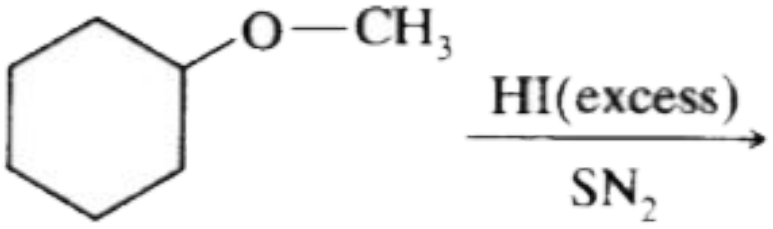
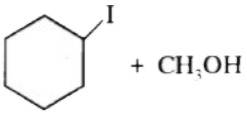
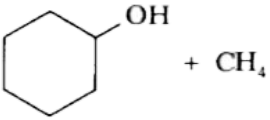
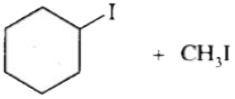
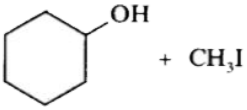
17. 

Final product will be

A. 

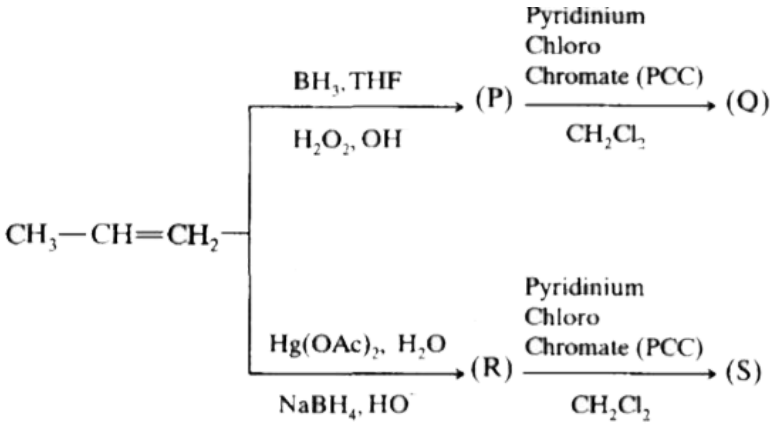
B. 

C. 

D. 

Answer: C

View Text Solution



18.

Relationship between products (Q) and (S) is

A. positional isomer

B. chain isomer.

C. stereoisomer.

D. functional isomer.

Answer: D

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19. Incorrect statement regarding Williamson ether synthesis is

A. less hindered halide is used in this reaction.

B. less hindered alkoxide ion is used in this reaction.

C. mechanism of reaction will be Sp^2.

D. more hindered halide is used in this reaction.

Answer: D

View Text Solution

20. Which of the given compound do not undergo acid catalyzed hydrolysis?

A. $Ph - O - Ph$

B. $Ph - O - CH = CH_2$

C. $Ph - O - CH_2 - Ph$

D. $CH_3 - O - CH_2CH_3$

Answer: A

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21. Williamson synthesis of ether is an example of

A. nucleophilic addition

B. electrophilic addition

C. electrophilic substitution

D. nucleophilic substitution

Answer: D

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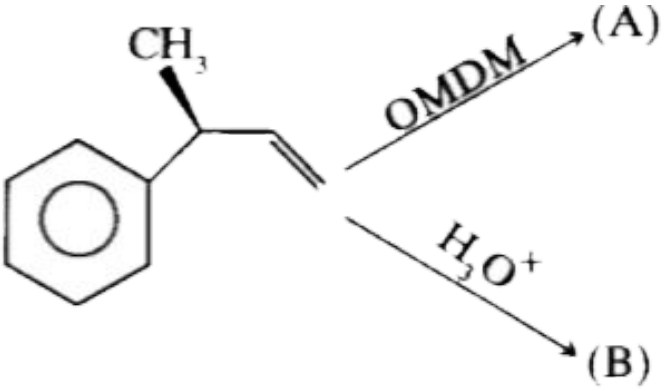
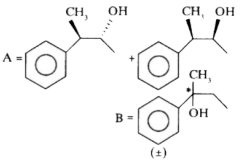
22. Predict the major products (A) and (B)

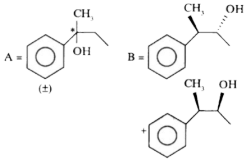


(OMDM is oxymercuration demercuration)

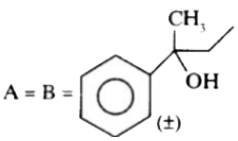
A.

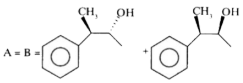


B.



C.



D. 

Answer: A

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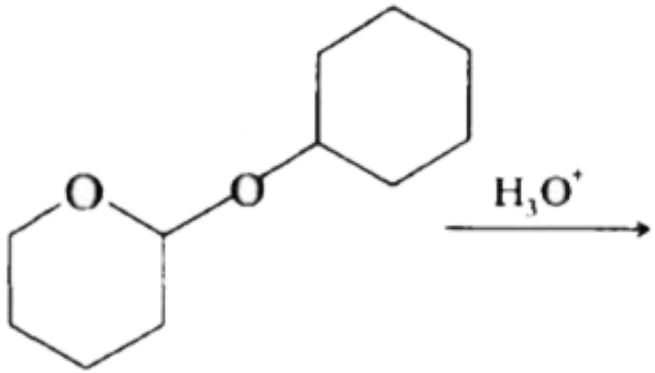
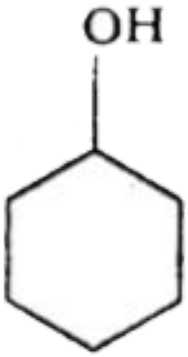
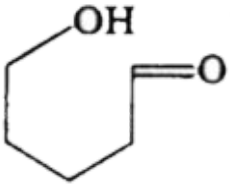
23. The product of the following reaction is



A. 

B. 

C. Both (a) and (b)

D. No reaction

Answer: C

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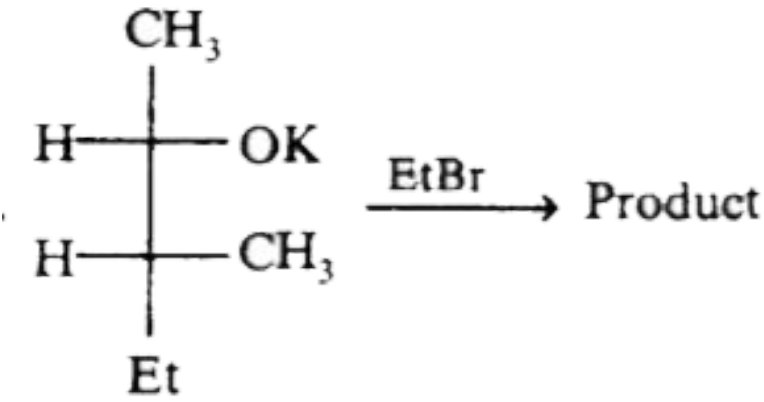
24.



Correct stereochemical relationship between reactant and product will be

A. enantiomer

B. diastereomer

C. structural isomer

D. none of these

Answer: D

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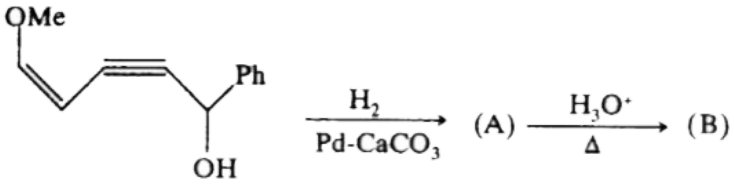
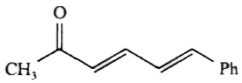
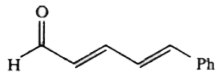
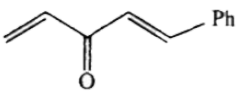
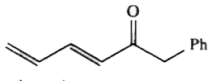
25. 

A. 

B. 

C. 

D. 

Answer: B

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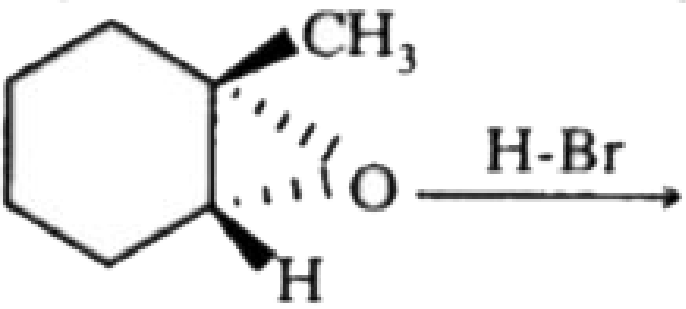
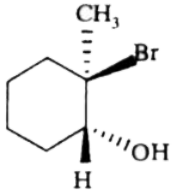
26. Choose the major product of the following reaction



A. 

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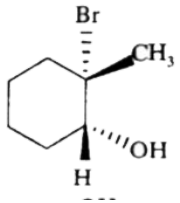

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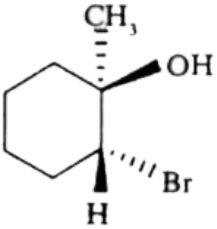
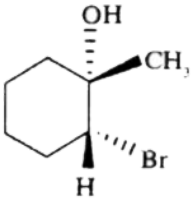


D.



Answer: A

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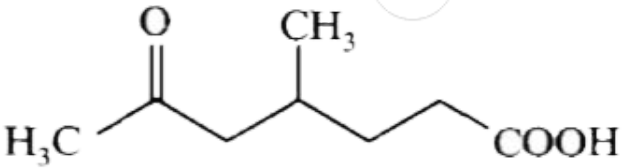
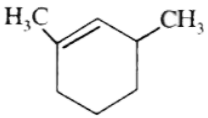
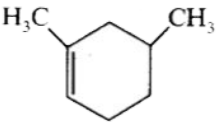
Additional Objective Questions Linked Comprehension Type Paragraph For Question 1 To 4

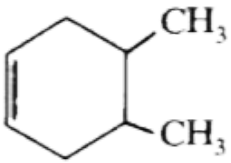
1. Compound A of formula $C_8H_{14}O$ reacts with $LiAIH_4$ to yield two isomeric products B and C, both in equal yield. Heating either B or C with conc. H_2SO_4 produces D with for mula C_8H_{14} . Ozonolysis of D produces a keto aldehyde after Zn/H_2O treatment. Oxidation of this keto aldehyde with aq. Cr (VI) produces

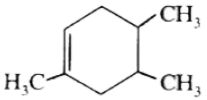


The structure of D is

A. 

B. 

C. 

D. 

Answer: B

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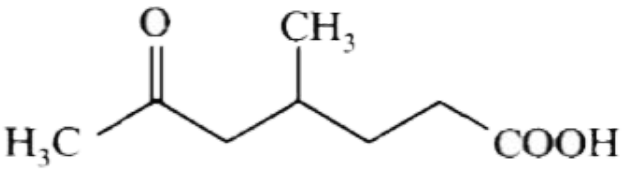
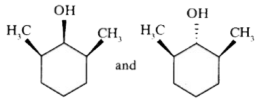
Additional Objective Questions Linked Comprehension Type Paragraph For Question 1 To 5

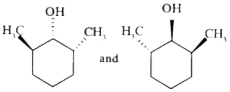
1. Compound A of formula $C_8H_{14}O$ reacts with $LiAIH_4$ to yield two isomeric products B and C, both in equal yield. Heating either B or C with conc. H_2SO_4 produces D with for mula C_8H_{14} . Ozonolysis of D produces a keto aldehyde after Zn/H_2O treatment. Oxidation of this keto

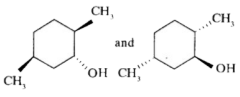
aldehyde with aq. Cr (VI) produces

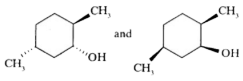


The structures of B and C are

A. 

B. 

C. 

D. 

Answer: A

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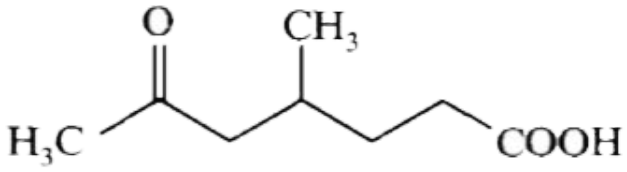
Additional Objective Questions Linked Comprehension Type Paragraph For Question 1 To 6

1. Compound A of formula $C_8H_{14}O$ reacts with $LiAIH_4$ to yield two isomeric products B and C, both in equal yield. Heating either B or C with conc. H_2SO_4 produces D with for mula C_8H_{14} . Ozonolysis of D produces a keto aldehyde after Zn/H_2O treatment. Oxidation of this keto aldehyde with aq. Cr (VI) produces



The compounds B and C are

A. enantiomers

B. meso compound

C. disastereomers

D. constitutional isomers.

Answer: C

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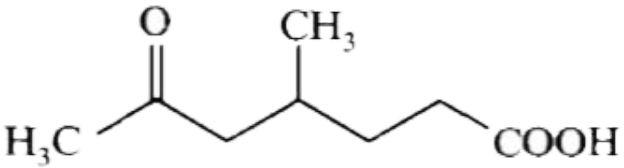
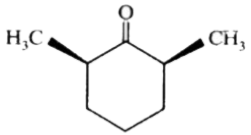
Additional Objective Questions Linked Comprehension Type Paragraph For Question 1 To 7

1. Compound A of formula $C_8H_{14}O$ reacts with $LiAIH_4$ to yield two isomeric products B and C, both in equal yield. Heating either B or C with conc. H_2SO_4 produces D with for mula C_8H_{14} . Ozonolysis of D produces a keto aldehyde after Zn/H_2O treatment. Oxidation of this keto aldehyde with aq. Cr (VI) produces



The structure of A is

A.



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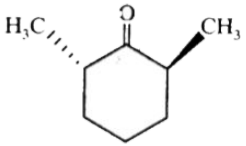
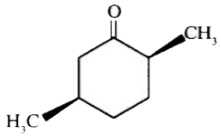
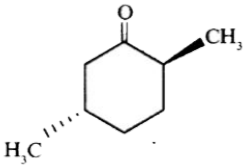


C.



D.



Answer: A

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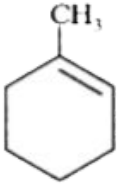
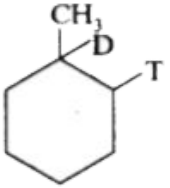
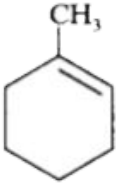
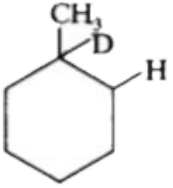
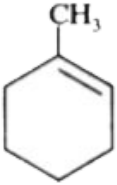
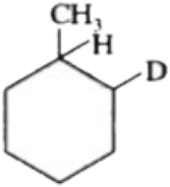
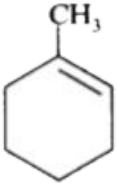
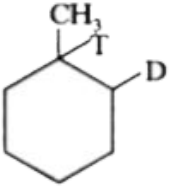
Additional Objective Questions Matrix Match Type

1.

Column I Reaction		Column II Product
(a) 	(1) BD_3: THF (2) CH_3CO_2T	(p) 
(b) 	(1) BT_3: THF (2) CH_3CO_2D	(q) 
(c) 	(1) BD_3: THF (2) CH_3CO_2H	(r) 
(d) 	(1) BH_3: THF (2) CH_3CO_2D	(q) 

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Column I	Column II
(a) $CH_3CH_2\underset{OH}{\underset{\vert}{CH}}-\underset{OH}{\underset{\vert}{CH}}-CH_2CH_3 \xrightarrow{HIO_4}$	(p) $2H_2C=O + HCOOH$
(b) $PhCH_2\underset{OH}{\underset{\vert}{CH}}-\underset{OH}{\underset{\vert}{CH}}-CH_3 \xrightarrow{HIO_4}$	(q) $2CH_3CH_2CH=O$
(c) $\underset{OH}{\underset{\vert}{CH_2}}-\underset{OH}{\underset{\vert}{CH_2}} \xrightarrow{HIO_4}$	(r) $2H_2C=O$
(d) $\underset{OH}{\underset{\vert}{CH_2}}-\underset{OH}{\underset{\vert}{CH}}-\underset{OH}{\underset{\vert}{CH_2}} \xrightarrow{HIO_4}$	(s) $PhCH_2CH=O + CH_3CH=O$

2.

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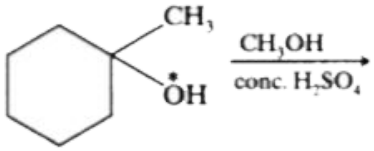
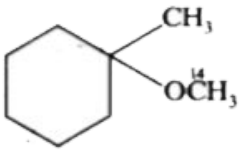
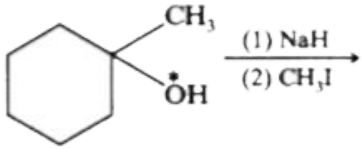
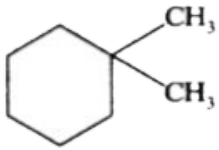
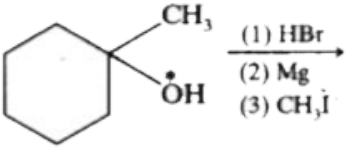
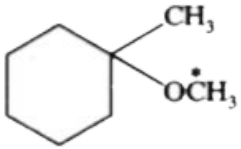
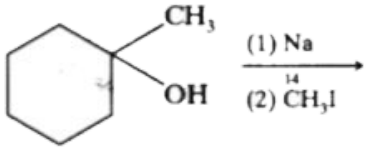
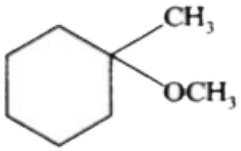
3.

Column I Reaction		Column II Product	
(a)		(p)	
(b)		(q)	
(c)		(r)	
(d)		(s)	

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