

(Chapter 11)(Alcohols Phenols and Ethers)

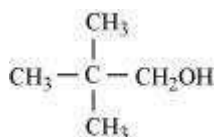
XII

Intext Questions

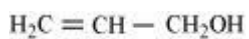
Question 11.1:

Classify the following as primary, secondary and tertiary alcohols:

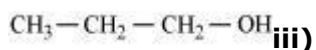
(i)



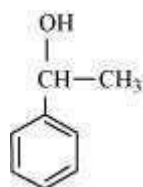
(ii)



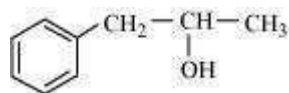
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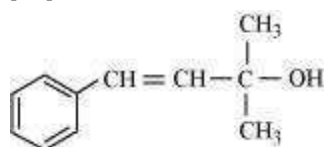
(iv)



(v)



(vi)



Answer

Primary alcohol $\rightarrow$ (i), (ii), (iii)

Secondary alcohol $\rightarrow$ (iv), (v)

Tertiary alcohol $\rightarrow$ (vi)

Question 11.2:

Identify allylic alcohols in the above examples.

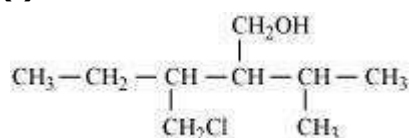
Answer

The alcohols given in (ii) and (vi) are allylic alcohols.

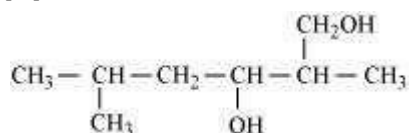
Question 11.3:

Name the following compounds according to IUPAC system.

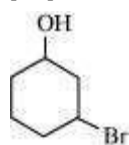
(i)



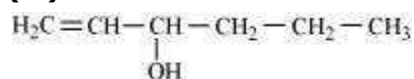
(ii)



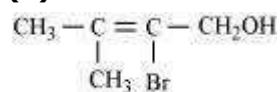
(iii)



(iv)



(v)



Answer

(i) 3-Chloromethyl-2-isopropylpentan-1-ol

(ii) 2, 5-Dimethylhexane-1, 3-diol

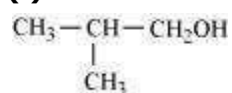
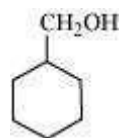
(iii) 3-Bromocyclohexanol

(iv) Hex-1-en-3-ol

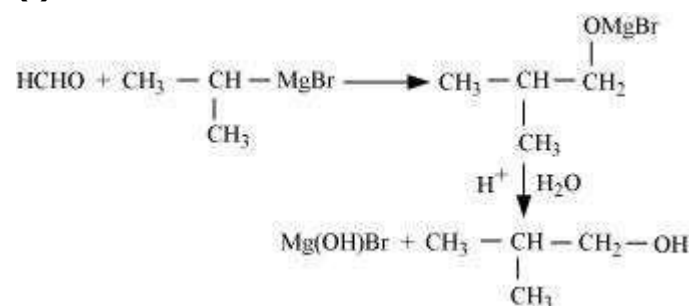
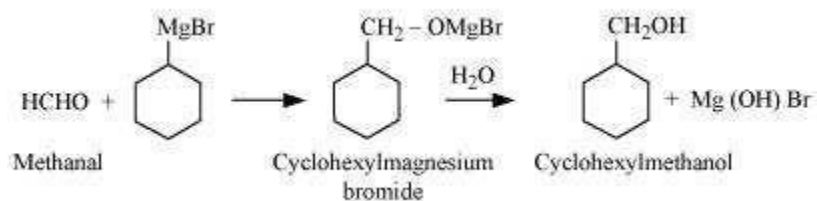
(v) 2-Bromo-3-methylbut-2-en-1-ol

Question 11.4:

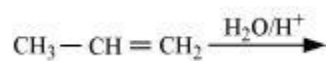
Show how are the following alcohols prepared by the reaction of a suitable Grignard reagent on methanal?

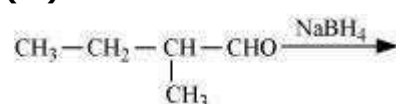
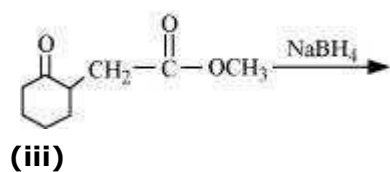
(i)**(ii)**

Answer

(i)**(ii)****Question 11.5:**

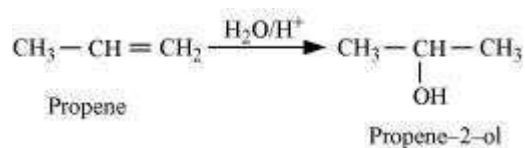
Write structures of the products of the following reactions:

(i)**(ii)**

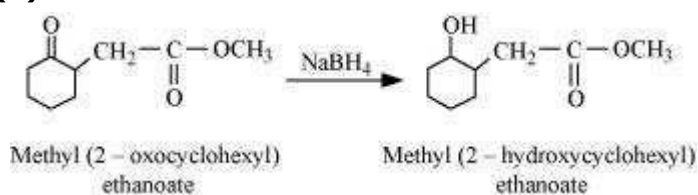


Answer

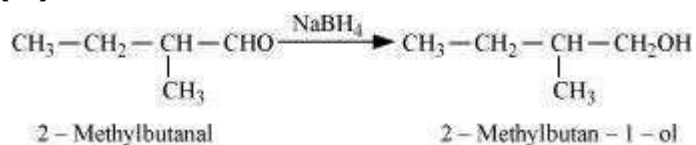
(i)



(ii)



(iii)



Question 11.6:

Give structures of the products you would expect when each of the following alcohol reacts with (a) HCl-ZnCl₂ (b) HBr and (c) SOCl₂.

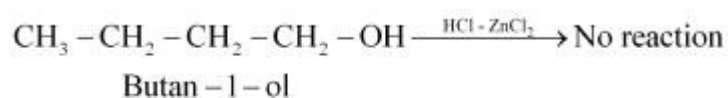
(i) Butan-1-ol

(ii) 2-Methylbutan-2-ol

Answer

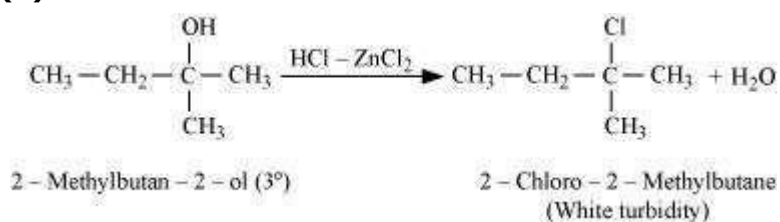
(a)

(i)



Primary alcohols do not react appreciably with Lucas' reagent (HCl-ZnCl₂) at room temperature.

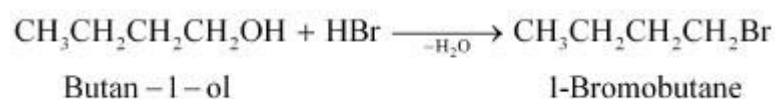
(ii)



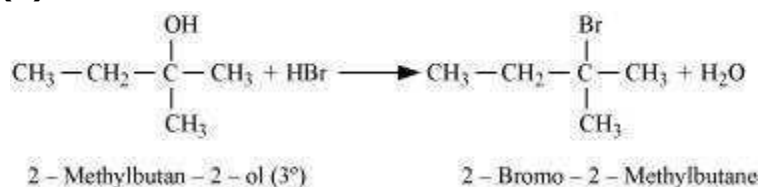
Tertiary alcohols react immediately with Lucas' reagent.

(b)

(i)

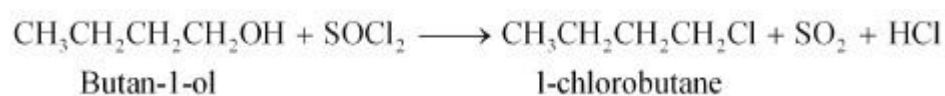


(ii)

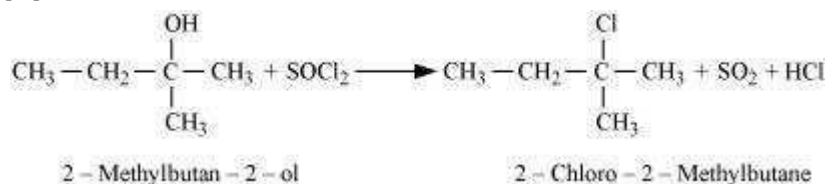


(c)

(i)



(ii)



Question 11.7:

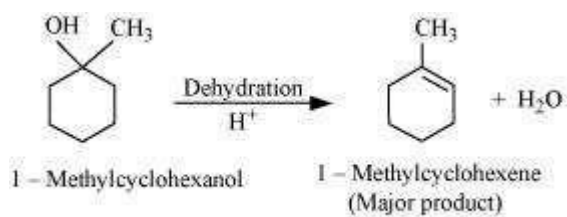
Predict the major product of acid catalysed dehydration of

(i) 1-methylcyclohexanol and

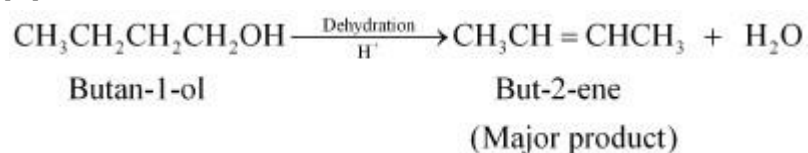
(ii) butan-1-ol

Answer

i.



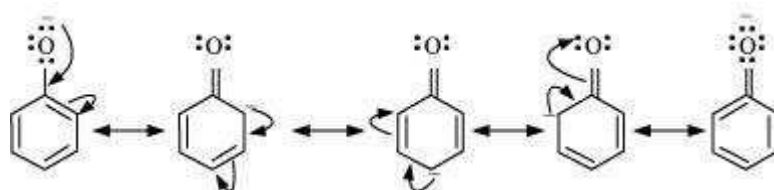
(ii)



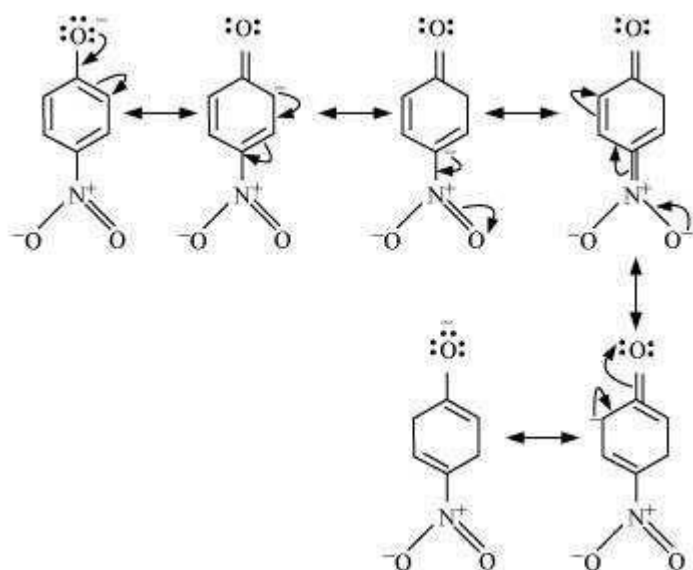
Question 11.8:

Ortho and *para* nitrophenols are more acidic than phenol. Draw the resonance structures of the corresponding phenoxide ions.

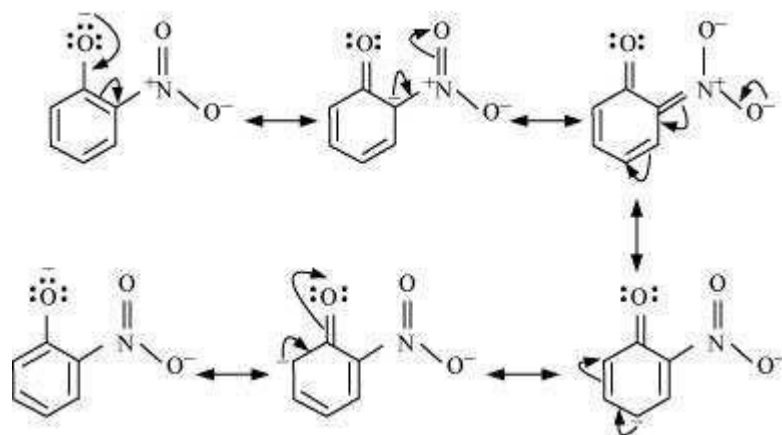
Answer



Resonance structure of the phenoxide ion



Resonance structures of *p*-nitrophenoxide ion



Resonance structures of *m*-nitrophenoxide ion

It can be observed that the presence of nitro groups increases the stability of phenoxide ion.

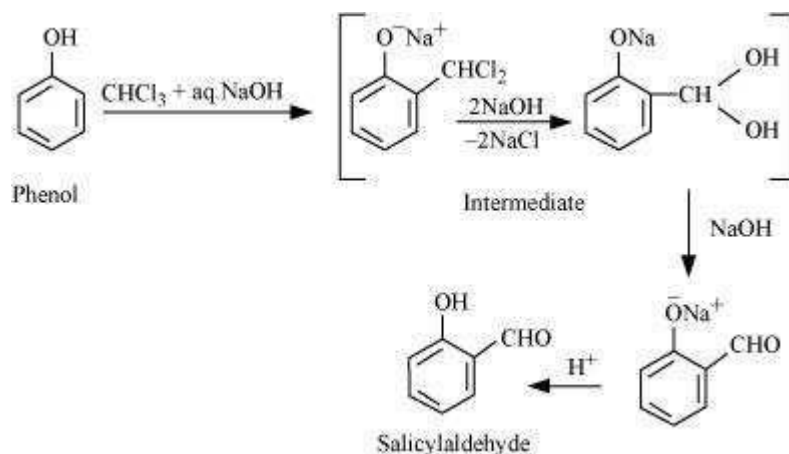
Question 11.9:

Write the equations involved in the following reactions:

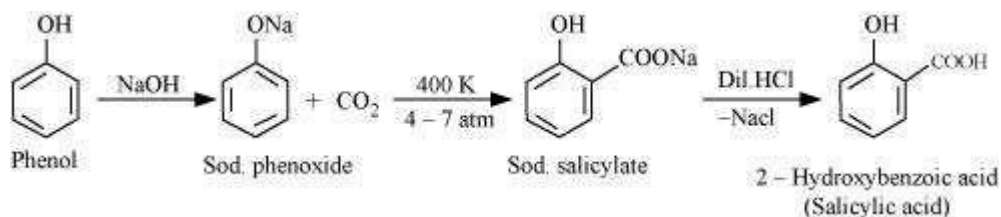
- (i) Reimer-Tiemann reaction
- (ii) Kolbe's reaction

Answer

i. **Reimer-Tiemann reaction**



ii. **Kolbe's reaction**

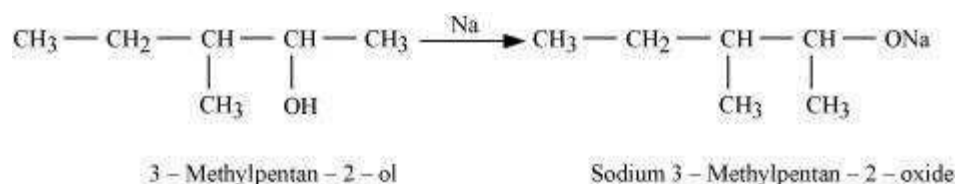
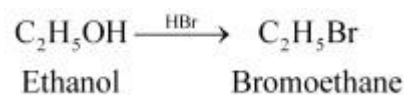


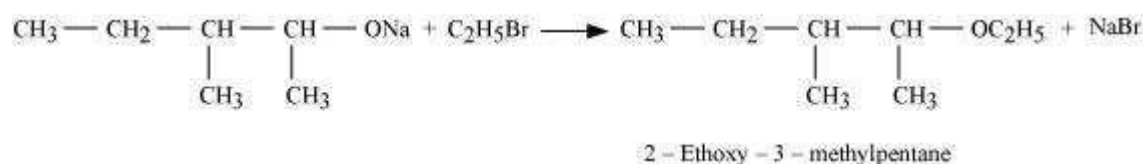
Question 11.10:

Write the reactions of Williamson synthesis of 2-ethoxy-3-methylpentane starting from ethanol and 3-methylpentan-2-ol.

Answer

In Williamson synthesis, an alkyl halide reacts with an alkoxide ion. Also, it is an $\text{S}_{\text{N}}2$ reaction. In the reaction, alkyl halides should be primary having the least steric hindrance. Hence, an alkyl halide is obtained from ethanol and alkoxide ion from 3-methylpentan-2-ol.

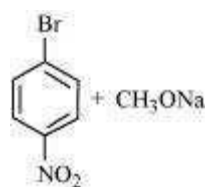




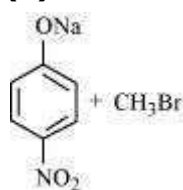
Question 11.11:

Which of the following is an appropriate set of reactants for the preparation of 1-methoxy-4-nitrobenzene and why?

(i)

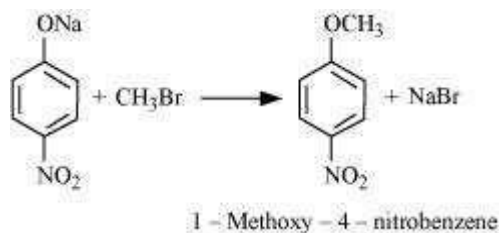


(ii)



Answer

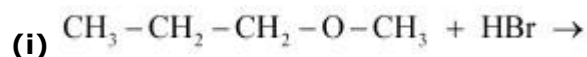
Set (ii) is an appropriate set of reactants for the preparation of 1-methoxy-4-nitrobenzene.



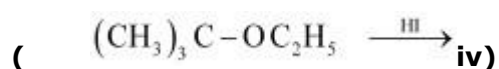
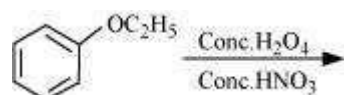
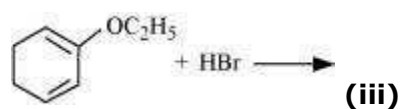
In set (i), sodium methoxide (CH_3ONa) is a strong nucleophile as well as a strong base. Hence, an elimination reaction predominates over a substitution reaction.

Question 11.12:

Predict the products of the following reactions:

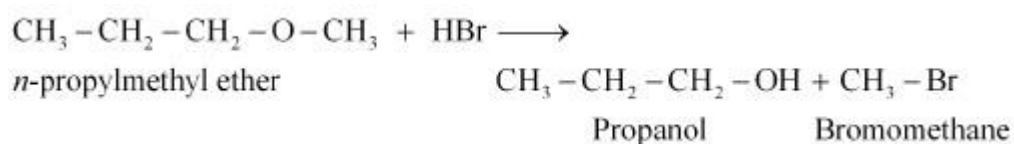


(ii)

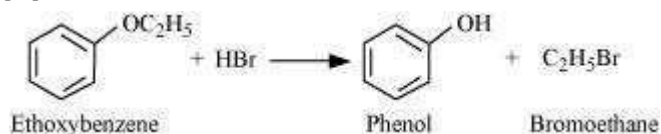


Answer

(i)



(ii)



(iii)



(iv)

