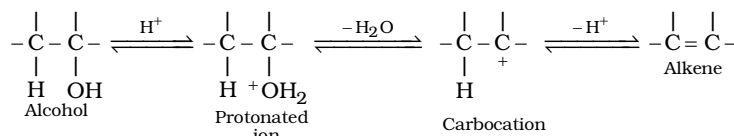


Daily Tutorial Sheet 1

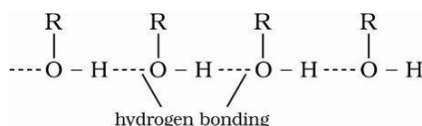
JEE Main [Archive]

- 1.(A) Dehydration of alcohol to alkene in presence of concentrated H_2SO_4 involves following steps :



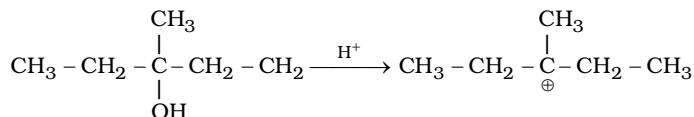
Thus, the initiation step is protonation of alcohol.

- 2.(D) The reason for the lesser volatility of alcohols than ethers is the intermolecular association of a large number of molecules due to hydrogen bonding as $-\text{OH}$ group is highly polarised.



No such hydrogen bonding is present in ethers.

- 3.(C) The ease of dehydration of alcohols is tertiary > secondary > primary according to the order of stability of the carbocations.



The more stable carbocation is generated thus more easily it will be dehydrated.

- 4.(C) $\rightarrow$ 3, 3-dimethyl-1-cyclohexanol

- 5.(D) Vapour density = $\frac{\text{Molecular weight}}{2}$

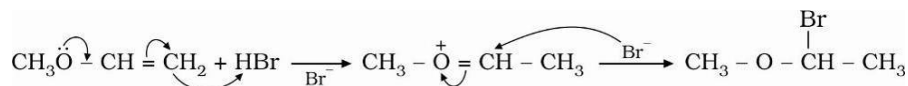
As both the compounds have same molecular weights, both will have the same vapour density. Hence, gaseous density of both ethanol and dimethyl ether would be same under identical conditions of temperature and pressure. The rest of these three properties; vapour pressure, boiling point and heat of vaporization will differ as ethanol has hydrogen bonding whereas ether does not.

- 6.(B)

- 7.(D) Pyridinium chlorochromate oxidises an alcoholic group chemoselectivity in the presence of carbon-carbon double bond.

- 8.(D)

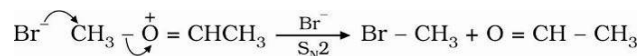
➤ Under anhydrous conditions, HBr does not ionise freely to give H^+ , so visualise the reaction as follows:



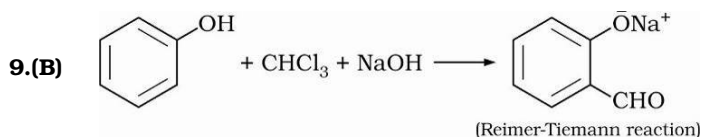
So effectively addition of Br^- as nucleophile occurs across double bond.

Note :

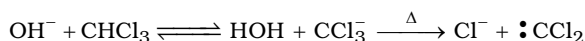
- If anhydrous condition are not there i.e., HBr (conc.) is given :



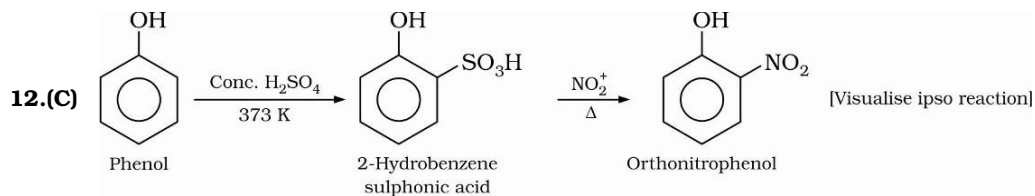
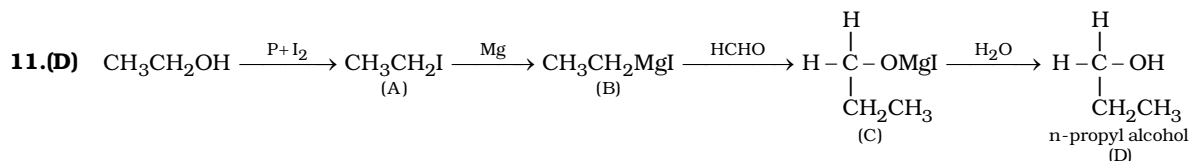
Due to polar protic solvent, $\text{CH}_3 - \overset{+}{\text{O}} =$ bond is broken by $\text{S}_{\text{N}}2$ attack of Br^- ion.



The electrophile is dichlorocarbene, :CCl_2 generated from chloroform by the action of a base.



- 10.(B)** $\text{CH}_3\text{OH} + \text{C}_6\text{H}_5\text{MgBr} \rightarrow \text{C}_6\text{H}_6 + \text{Mg}(\text{OCH}_3)\text{Br}$ (Grignard reagent abstract proton from MeOH)



Note also refer to solution of Q.87 [Level-2]

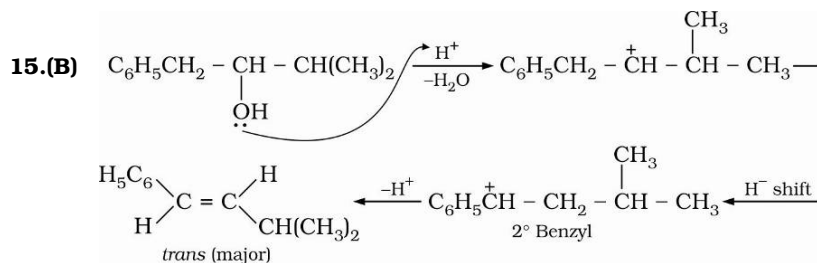
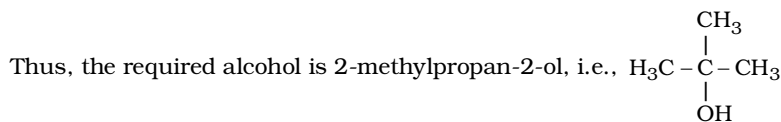
- 13.(C)** The reaction of phenol with NaOH and CO_2 is known as Kolbe's reaction. The product is salicylic acid. Refer to notes for mechanism of the reaction.

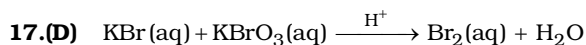
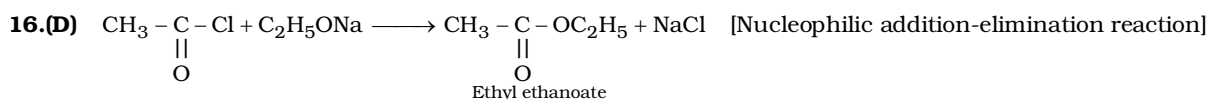
- 14.(C)** The reagent, conc. HCl and anhydrous ZnCl_2 is Lucas reagent, which is used to distinguish between 1° , 2° and 3° alcohols.

3° alcohol + Lucas reagent $\longrightarrow$ Immediate turbidity

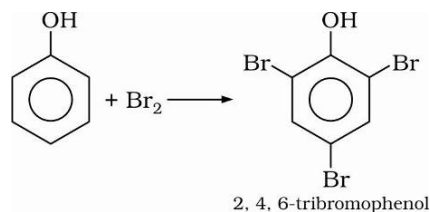
2° alcohol + Lucas reagent $\longrightarrow$ Turbidity after 5-10 minutes

1° alcohol + Lucas reagent $\longrightarrow$ No reaction

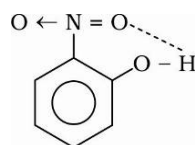




This bromine reacts with phenol to give 2, 4, 6-tribromophenol. Refer module for detailed explanation.



- 18.(A)** o-Nitrophenol shows intramolecular hydrogen bonding due to which it fails to form H-bonds with water and hence it is insoluble.



- 19.(D)** Electron donating group ($-\text{CH}_3$ and $-\text{OCH}_3$) decrease acidic strength while withdrawing electron groups ($-\text{NO}_2$ and $-\text{Cl}$) increase the acidity. Since $-\text{OCH}_3$ (+M) is a stronger electron donating group than $-\text{CH}_3$ (+H) and NO_2 (-M) is stronger electron withdrawing group than $-\text{Cl}$, therefore order of decreasing acidity is III > I > II > IV.

- 20.(A)** PCC is highly effective in oxidizing 1° alcohols to aldehydes, as it does not oxidise aldehydes further.