

## SHORT QUESTIONS

**Q.1 Ethyl alcohol is a liquid while ethyl chloride is a gas?**

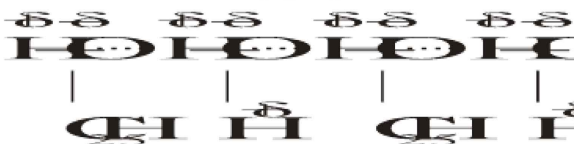
**Ans.** In ethyl alcohol due to the presence of  $\text{-OH}$  group, hydrogen bonding is present between the molecules. In case of ethylchloride only dipole-dipole forces are present. Due to greater intermolecular forces ethylalcohol exists in liquid state at room temperature.

**Q.2 Ethanol has higher boiling point than diethyl ether?**

**Ans.** The boiling point of ethylalcohol is high due to hydrogen bonding in it. In diethyl ether, no hydrogen atom is linked with highly electronegative element and hydrogen bonding does not exist.

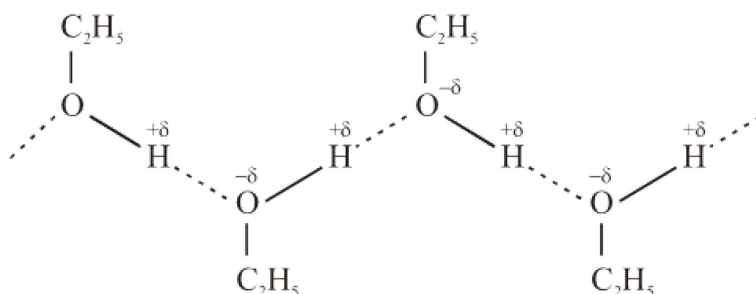
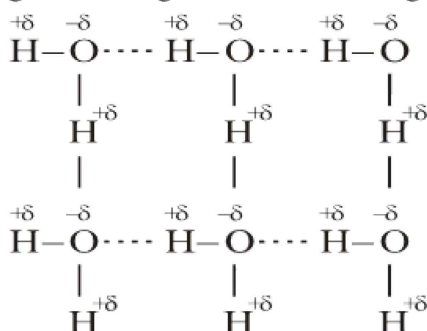
**Q.3 Alcohols is soluble in water with any proportion, why?**

**Ans.** Both water and ethanol develops hydrogen bonding in them. Due to hydrogen bonding they can dissolve with any proportion.



**Q.4 Water has higher boiling point than ethanol?**

**Ans.** Water and ethanol both have hydrogen bonding in them separately. Water utilizes its two lone pair for hydrogen bonding while ethanol utilizes only one pair. Due to strong hydrogen bonding in water it has higher boiling point.



**Q.5 Absolute alcohol cannot be prepared by fermentation process?**

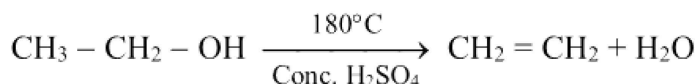
**Ans.** The optimum conditions for the activity of enzyme are based upon the pH, temperature, dilution of solution. In dilute solution, enzymes are more active. In fermentation process,

maximum 12 – 14% alcohol can be prepared. If concentration of alcohol increases activity of enzymes decreases.

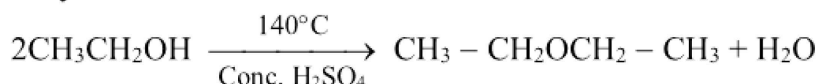
**Q.6 Ethanol gives different products with concentrated sulphuric acid under different conditions?**

**Ans.** Ethanol gives different products under different conditions with conc. sulphuric acid:

- (i) If concentration of acid is high and alcohol is low at 180°C on dehydration ethene is formed.



- (ii) If concentration of acid is less and alcohol is high at 140°C ether is formed on dehydration.

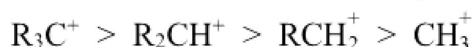


- (iii) At room temperature, ethyl bisulphate is formed.



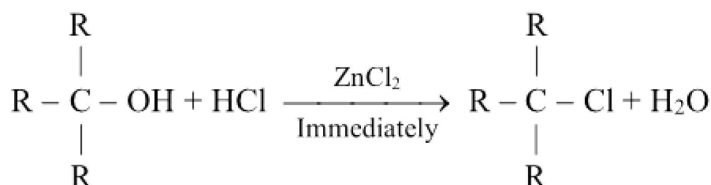
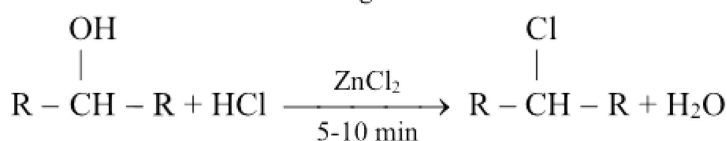
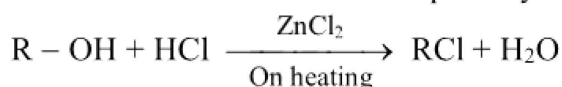
**Q.7 When C – O bond of alcohol breaks the order of reactivity is ter alcohol > sec alcohol > primary alcohol, why?**

**Ans.** When C – O bond of alcohol breaks, carbocation are formed. Tertiary carbocation is more stable than secondary and it is more stable than primary carbocations. The stability gives the estimation of bond breakage. The stability order is



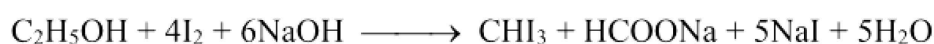
**Q.8 How will you distinguish between primary, secondary and tertiary alcohols?**

**Ans.** Primary, secondary and tertiary alcohols can be distinguished by Lucas test. In this test alcohol is treated with HCl and  $\text{ZnCl}_2$ . Tertiary alcohols react immediately, secondary alcohol react after 5 to 10 min while primary alcohol react only on heating.



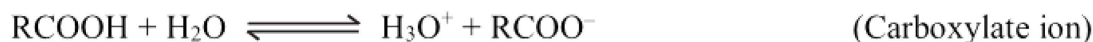
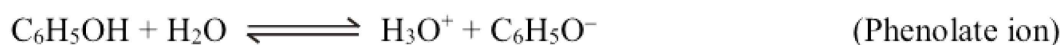
**Q.9 How will you distinguish between methanol and ethanol?**

**Ans.** Methanol and ethanol can be distinguished by iodoform test. Ethanol reacts with NaOH and iodine to form the yellow precipitate of  $\text{CHI}_3$  while methanol does not perform this test.



**Q.10 Carboxylic acids are more acidic than phenol, why?**

**Ans.** Strength of acid depends upon its dissociation Carboxylate ions is more stable than phenolate ion.



**Q.11 How will you distinguish between carboxylic acid and phenol?**

**Ans.** Phenol and carboxylic acid can be distinguished by  $\text{NaHCO}_3$  test. Add  $\text{NaHCO}_3$  in both the solutions. Phenols do not react with  $\text{NaHCO}_3$  while carboxylic acid evolves carbondioxide with effervescence.



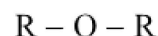
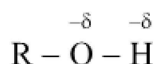
**Q.12 Phenol is acidic while ethanol is not although both have –OH group in them, why?**

**Ans.** The strength of an acid depends upon the stability of conjugate base of an acid. Phenolate ion is more stable due to resonance in it, while ethoxy ion is not stable and does not lose proton.



**Q.13 Ethers are less reactive than alcohols, why?**

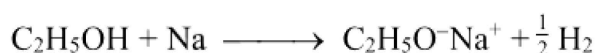
**Ans.** In case of alcohol one hydrogen atom is directly linked with highly electronegative atom oxygen and bond is polar in nature.



In case of ether no hydrogen is linked with oxygen atom directly. Ethers do not react with alkalies, sodium metal, dilute acids, oxidizing or reducing agents.

**Q.14 How will you distinguish between ethanol and diethyl ether?**

**Ans.** Ethers do not react with sodium metal while all alcohols react with sodium metal and hydrogen gas is evolved.



Both can also be distinguish by iodoform test.

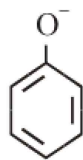
**Q.15 Arrange the following compounds in order to their increasing acid strength and give reason.  $\text{H}_2\text{O}$ ,  $\text{C}_2\text{H}_5\text{OH}$ ,  $\text{C}_6\text{H}_5\text{OH}$ ,  $\text{C}_6\text{H}_5\text{COOH}$ .**

**Ans.** Increasing acid strength is the following order:

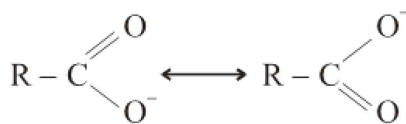


Acid strength depends upon the dissociation of compound and stability of the anion conjugate base.

Carboxylate ions  $\text{RCOO}^-$  are more stable than phenolate ion due to resonance stability.



Phenolate ion



Carboxylate ion

Alcohols are less acidic than phenol because in phenoxide ion, charge of oxygen is delocalized while charge of oxygen in  $\text{RO}^-$  is localized.

Anion of water  $\text{OH}^-$  is least stable and most reactive.

Dissociation of compounds is as follows:

