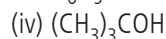
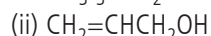
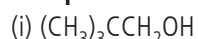


Alcohols, Phenols and Ethers

TRY YOURSELF

ANSWERS

1. Compound



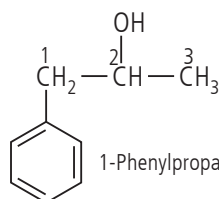
Classification

Primary alcohol

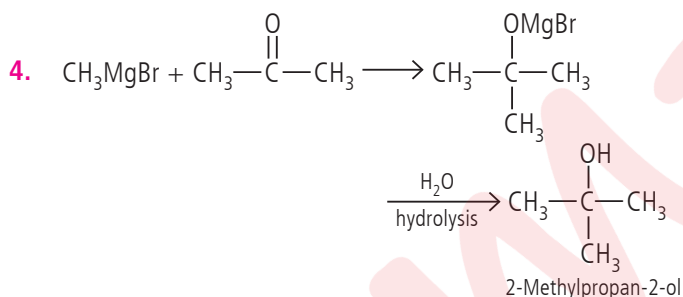
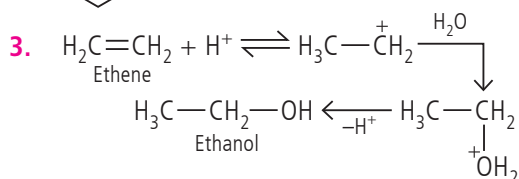
Primary alcohol

Secondary alcohol

Tertiary alcohol

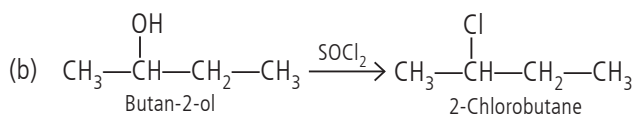
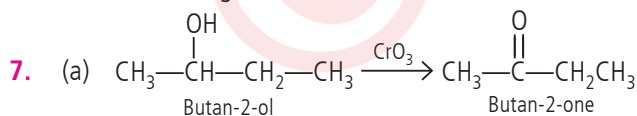


2.

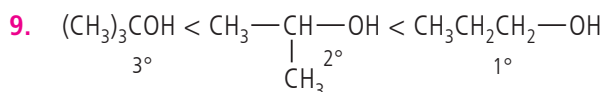


5. It is due to higher molecular weight, more surface area, more van der Waals' forces of attraction in $\text{C}_2\text{H}_5\text{OH}$ than CH_3OH .

6. Solubility of alcohols in water is due to their ability to form hydrogen bonds with water molecules. The solubility decreases with increase in size of alkyl groups and solubility increases with increase in branching and the order is $1^\circ < 2^\circ < 3^\circ$.

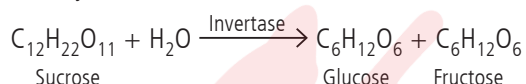


8. The +I effect of three methyl groups on central carbon atom of *t*-butyl alcohol makes it partially negative as a result it pushes the electron pair of O-H bonds towards H-atoms and thus makes O-H bond more strong.

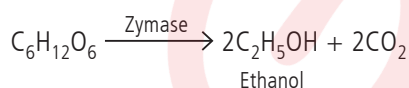


10. The process of breaking of large organic molecule into smaller ones in the presence of enzyme is called fermentation. It takes place in anaerobic conditions *i.e.*, in absence of air and in presence of enzymes.

The sugar is converted to glucose and fructose in the presence of enzyme invertase.

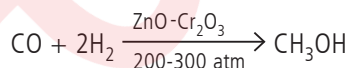


Glucose and fructose undergo fermentation in presence of enzyme zymase to give ethanol.



11. 2-Propanol will give yellow precipitate of iodoform on addition of I_2 and NaOH while 2-methyl-2-propanol will not.

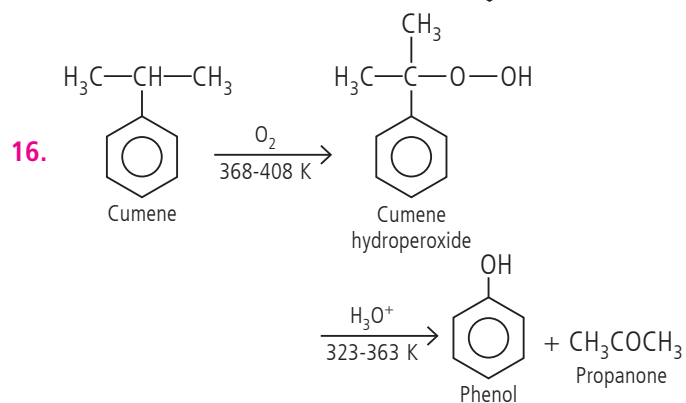
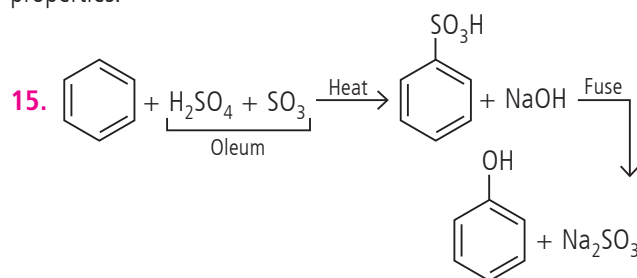
12. (a) Methanol is produced by destructive distillation of wood. It is also produced by catalytic hydrogenation of carbon monoxide at high pressure and temperature.



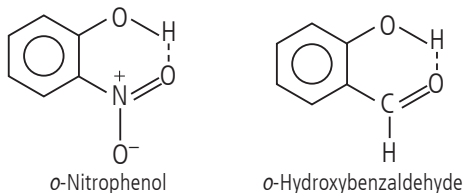
(b) Methanol is chiefly used for the preparation of formaldehyde.

13. (a) 2,5-Dinitrophenol, (b) Phenol-2, 4-disulphonic acid

14. They are considered to be different functional groups. Phenols are aromatic compounds whereas alcohols are aliphatic compounds. They react differently as they do not have the same properties.

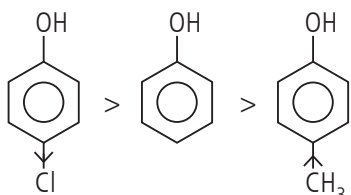


17. Intramolecular H-bonding (chelation) in the *o*-isomers inhibits intermolecular attraction, which lowers the boiling point, reduces H-bonding with H₂O, decreases water solubility. Intramolecular chelation cannot occur in *m*- and *p*-isomers.

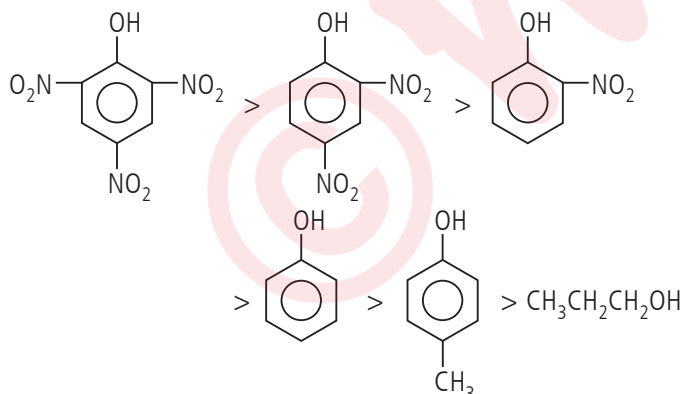


18. In phenol, conjugation of unshared electron pair over oxygen with aromatic ring results in partial double bond character in carbon-oxygen bond. In phenol, oxygen is attached to a sp^2 hybridised carbon atom while in methanol, it is attached to a sp^3 hybridised carbon atom. The bond formed between oxygen and sp^2 hybridised carbon is more stable than that formed between oxygen and sp^3 hybridised carbon. These factors are responsible for smaller C – O bond length in phenol as compared to methanol.

19. (i) Due to $-I$ effect of $-Cl$ group, *p*-chlorophenol is more acidic than phenol whereas due to $+I$ effect of $-CH_3$ group, *p*-cresol is less acidic than phenol. Hence, the order is

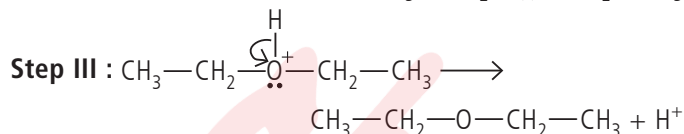
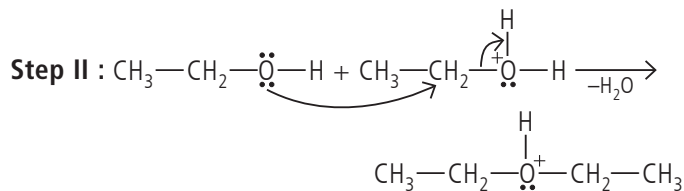
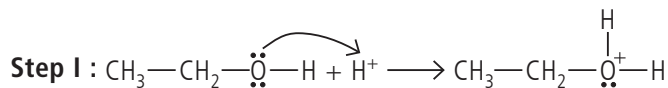


(ii) Electro withdrawing groups increases acidity and electron donating groups decrease acidity of phenol. Phenols are stronger acids than alcohols. Hence, the order is



20. Phenol is weaker acid than carbonic acid (H₂CO₃). Hence, it does not liberate CO₂ from NaHCO₃.

21. **Mechanism** : The formation of ether is nucleophilic bimolecular reaction.



22. The given conversion is not possible by treating sodium ethoxide with *t*-butyl chloride or bromide since, under these conditions an alkene *i.e.*, isobutylene (2-methylpropene) is the main product. If however, *t*-butyl chloride is heated with a weak nucleophile such as pure ethanol both substitution and elimination occur in which substitution product predominates. Thus,

