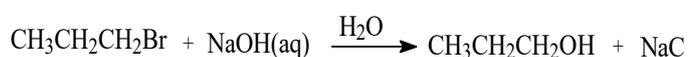
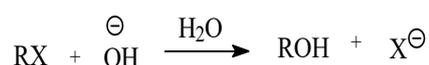


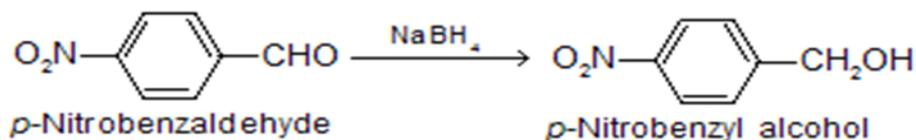
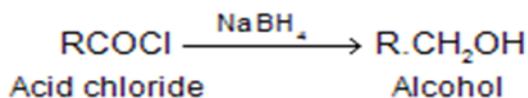
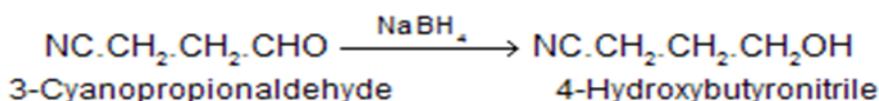
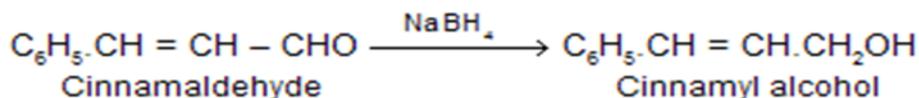
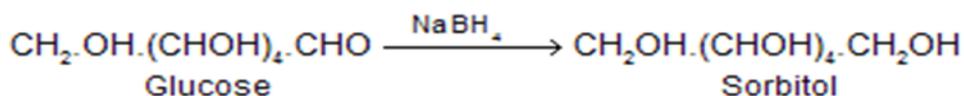
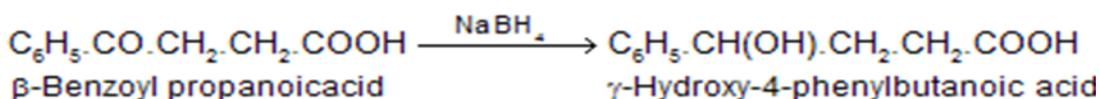
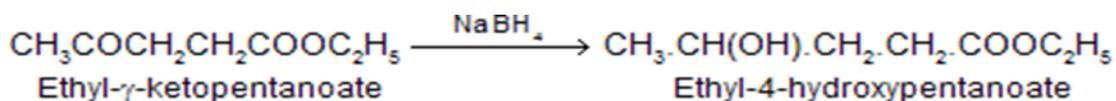
METHOD OF PREPARATION OF ALCOHOLS

The following methods are used for the preparation of alcohols:

- Hydrolysis of haloalkanes:** Haloalkanes can be converted to corresponding alcohols using aqueous NaOH, KOH or Ca (OH)₂. With this method primary and secondary alcohols are formed from a primary and secondary halogenoalkanes. This is a type of nucleophilic substitution reaction (S_N). This reaction is useful only with reactants that do not undergo E₂ elimination readily.



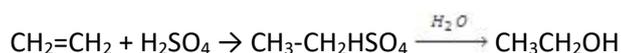
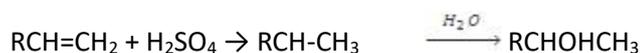
- Reduction of carbonyl compounds:** Carbonyl compounds (which contain –C=O group) such as aldehydes, ketones, carboxylic acids and esters can be reduced to alcohols. Aldehydes give primary alcohols while ketones yield secondary alcohols, either by catalytic hydrogenation or by use of chemical reducing agents like lithium aluminum hydride, LiAlH₄. Carboxylic acids and esters also give primary alcohols on reduction with hydride reagents such as LiAlH₄ and sodium borohydride



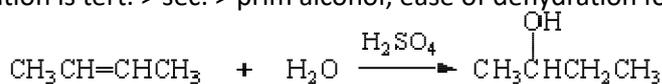
(NaBH₄). NaBH₄ does not reduce carbon-carbon double bonds, not even those conjugated with carbonyl groups, and is thus useful for the reduction of such unsaturated carbonyl compounds to unsaturated alcohols.

In the above reactions it is observed that only the carbonyl group is reduced and the other functional groups remain unaffected. Highly selective behaviour of NaBH₄ makes it the preferred reagent for the reduction of carbonyl groups insensitive polyfunctional group containing compounds.

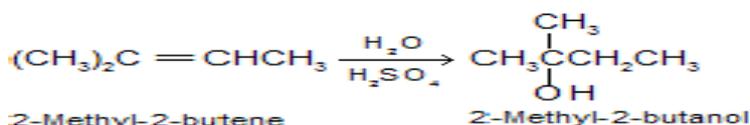
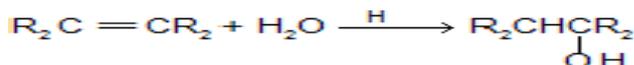
- 3. From hydration of alkenes:** Hydration i.e.s addition of H⁺ and OH⁻ across a C=C double bond to give alcohols. This is an electrophilic addition of H₂O to the alkene. Alcohols can be prepared by adding water to an alkene in the presence of a strong acid such as H₂SO₄. Because these reactions follow Markovnikov's rule, the product of the reaction is often a highly substituted 2° or 3° alcohol.



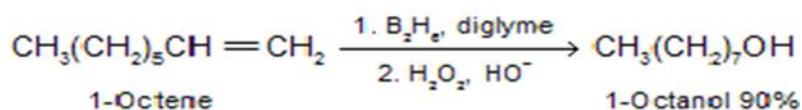
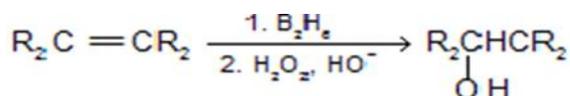
Ease of preparation is tert. > sec. > prim alcohol; ease of dehydration follows same sequence.



- 4. Oxidation of organoboranes:** When an alkene reacts with BH₃ (a boron



hydride) in THF solution, an organoborane is obtained. Hydroboration followed by oxidation will produce an alcohol. Since BH₃ has three hydrogens, above addition can occur three times to give trialkylborane. This is oxidised to alcohol by hydrogen peroxide (H₂O₂) in the presence of aqueous sodium hydroxide. The overall reaction is addition of water across the double bond opposite to that of Markovnikov's rule and the reaction is regioselective producing the least substituted alcohol.



(a) By reaction with esters: Produces tertiary alcohols in which two of the substituents on the hydroxyl-bearing carbon are derived from the Grignard reagent.

