β-ionone

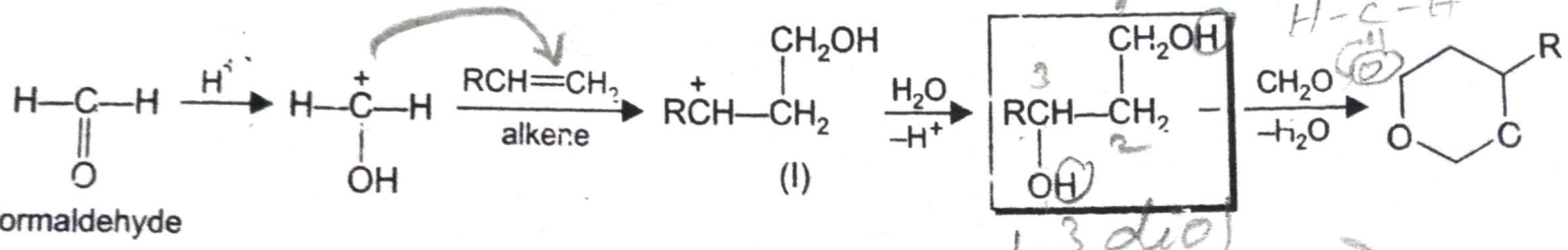
SCHEME 6.47

(B) Carbocations Derived from Aldehydes and Ketones

(i) Prins Reaction

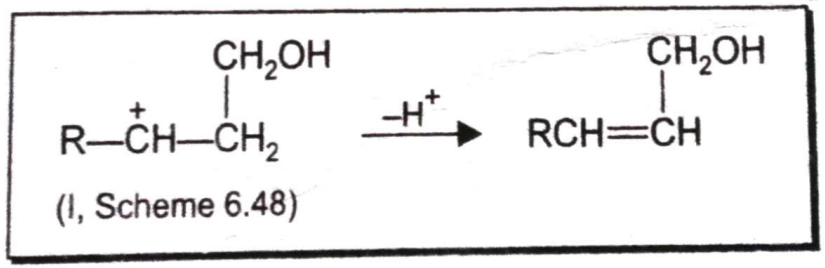
The acid catalysed addition of an olefin to formaldehyde in the presence of an acid is called the Prins reaction. The net result being the addition of hydroxymethylene group to a double bond. The reaction gives a 1, 3-diol together with a cyclic acetal (1, 3-dioxan) which is formed from

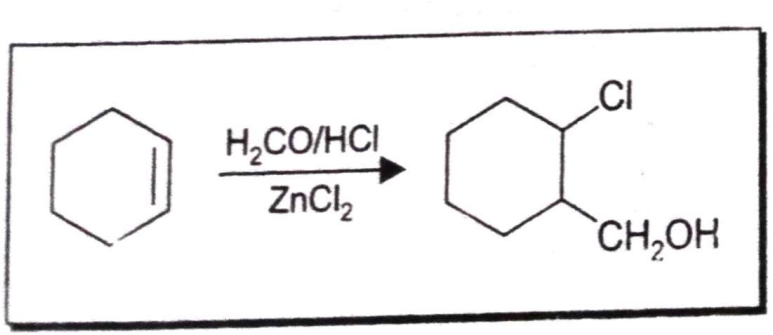
the diol by the addition of a second molecule of formaldehyde (Scheme 6.48). The mechanism involves electrophilic attack on both the double bonds. The acid protonates the C=O and the

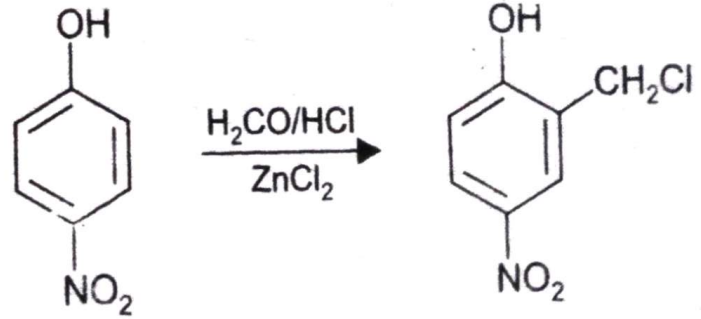


SCHEME 6.48

carbocation thus formed attacks the C=C. The resulting (I, Scheme 6.48) can add water to give a diol as shown or it can also undergo a loss of H^+ to give an olefin (Scheme 6.48*a*). Other examples of Prins reaction include the chloromethylation of phenol with formaldehyde and HCl (Scheme 6.48*a*).







SCHEME 6.48a