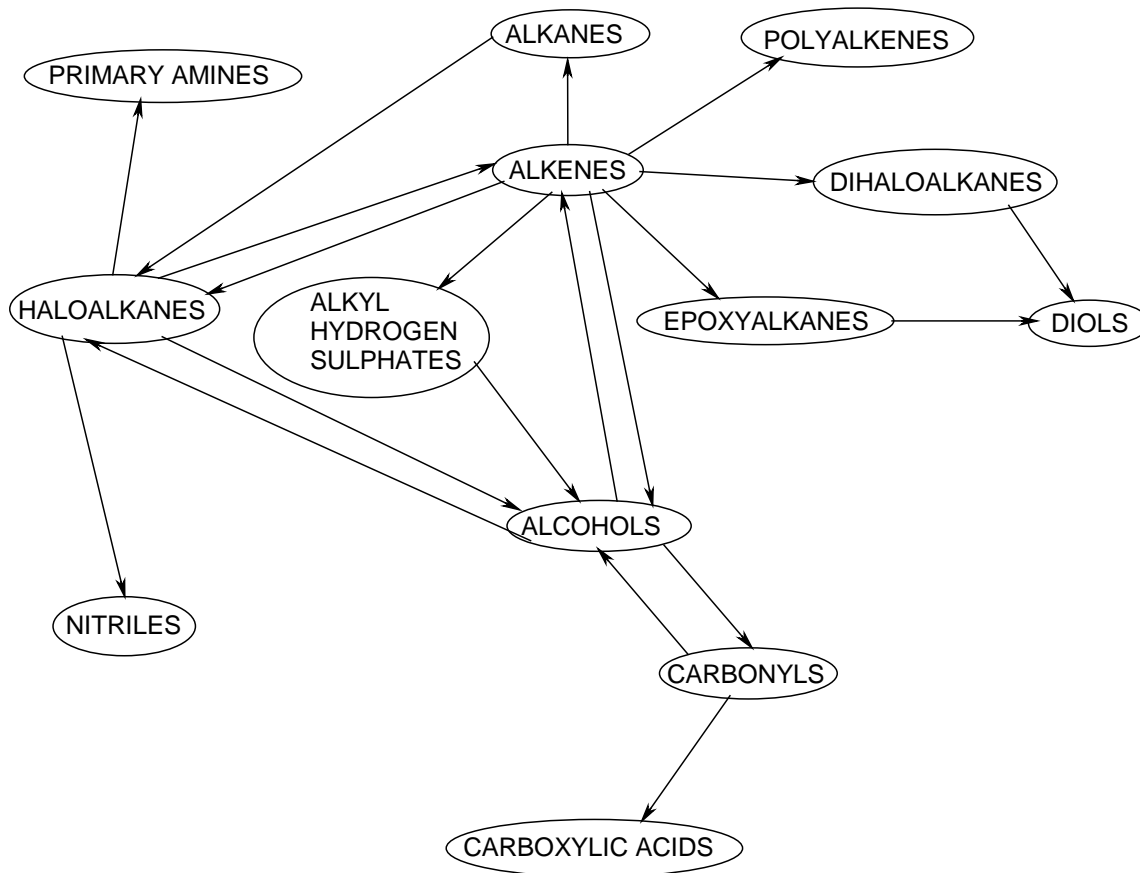


## SUMMARY OF REACTION PATHWAYS IN ORGANIC CHEMISTRY

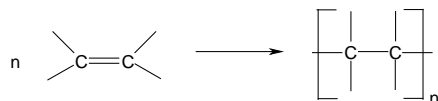


You need to know the equations, conditions, reagents and type of reaction for all these reactions.

You need to know the mechanism for some of them.

- Alkane → chloroalkane**  
 reagents:  $\text{Cl}_2$   
 conditions: UV light  
 mechanism: free radical substitution  
 equation:  $\text{RH} + \text{Cl}_2 \rightarrow \text{RCl} + \text{HCl}$

- Alkene → polyalkene**  
 Conditions: low T, high p.  
 Equation:



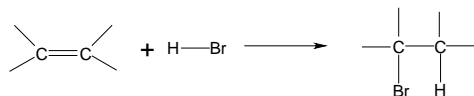
Type of reaction: addition polymerisation (free radical)

**3. Alkene → bromoalkane**

Reagent: HX(g)

Conditions: room T

Equation:



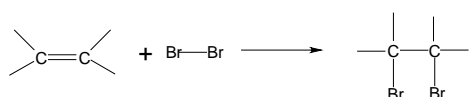
Type of reaction: electrophilic addition

**4. Alkene → dibromoalkane**

Reagent: Br<sub>2</sub> in water or in an organic solvent

Conditions: room T

Equation:



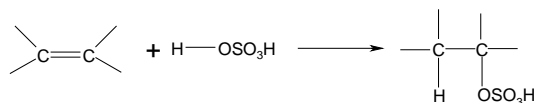
Mechanism: electrophilic addition

**5. Alkene → alkylhydrogensulphate**

Reagent: concentrated sulphuric acid

Conditions: cold

Equation:



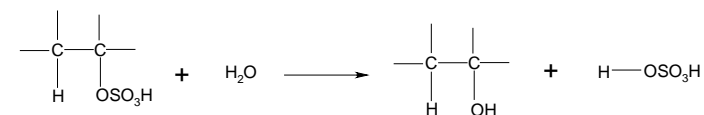
Mechanism: electrophilic addition

**6. Alkylhydrogensulphate → alcohol**

Reagent: water

Conditions: warm

Equation:



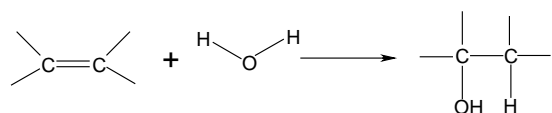
Type of reaction: hydrolysis

**7. Alkene → alcohol**

Reagent: steam

Conditions: 300 °C, 60 atm, H<sub>3</sub>PO<sub>4</sub> catalyst

Equation:



Type of reaction: hydration

**8. Haloalkane → alcohol**

Reagent: NaOH(aq) or KOH(aq)

Conditions: warm under reflux



Type of reaction: nucleophilic substitution

**9. Haloalkane → nitrile**

Reagent: KCN in aqueous ethanol

Conditions: boil under reflux



Type of reaction: nucleophilic substitution

**10. Haloalkane → Amine**

Reagent: ammonia in ethanol in a sealed tube

Conditions: heat



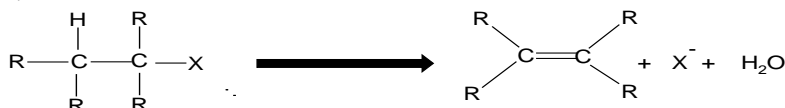
Type of reaction: nucleophilic substitution

**11. Haloalkane → alkene**

Reagent: KOH in ethanol

Conditions: heat

Equation:

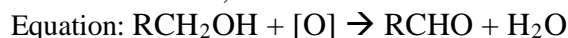


Type of reaction: elimination

**12. Primary alcohol → aldehyde**

Reagent: potassium dichromate and dilute sulphuric acid

Conditions: warm, distillation

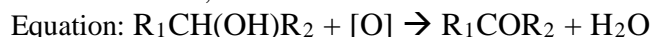


Type of reaction: mild oxidation

**13. Secondary alcohol → ketone**

Reagent: potassium dichromate and dilute sulphuric acid

Conditions: heat, distillation

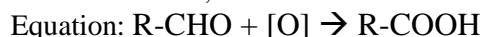


Type of reaction: oxidation

**14. aldehyde → carboxylic acid**

Reagent: potassium dichromate and dilute sulphuric acid

Conditions: heat, reflux



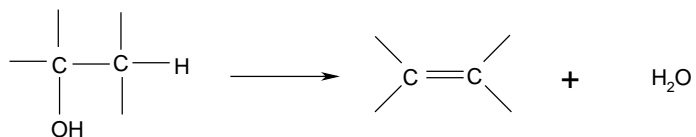
Type of reaction: oxidation

**15. Alcohols → alkenes**

Reagent: concentrated sulphuric acid

Conditions: heat

Equation:



Type of reaction: elimination

**16. glucose  $\rightarrow$  ethanol**

reagent: yeast

conditions: 35 – 55 °C, no air

equation:  $\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$

type of reaction: fermentation