

# Quick Study

## Stoichiometry

- > Mole – definition and meaning
- > Gram – atomic mass
- > Gram – molecular weight
- > Relative atomic mass
- > Isotopic abundance
- > Average atomic mass

Chemical calculation using mole concept based on Balanced chemical Reaction

### Theoretical Stoichiometry

- > Stoichiometric proportion
- > Non-stoichiometric proportion
- > Concept of limiting reagent

### Theoretical Stoichiometry

Reaction in aqueous solution

- > Redox
- > Acid base
- > Complex titrimetric
- > Precipitation

Gas Analysis

Reaction involving gaseous reactants and products

## Electrolytes, Electrolysis, conductance

Electrochemical cell

- ↳ Electrolytic cell
- ↳ Galvanic cell

- ↳ Types of half cells electrodes
- ↳ Concentration cells
- ↳ Electrolyte concentration cells
- ↳ Electrode concentration cells
- ↳ Type of batteries
- ↳ Setup of cell, its notation, its potential and equations and relationship between standard free energy & equilibrium constant

Electrolytic Conductance

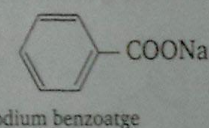
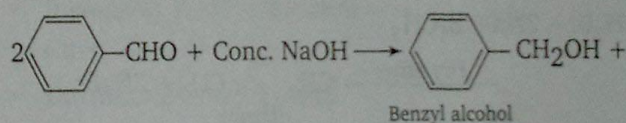
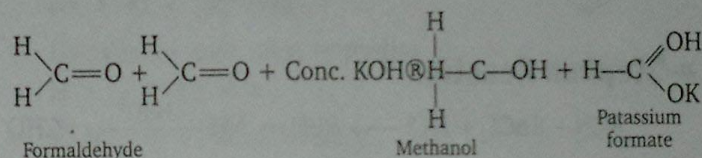
- ↳ Conductance of solution
- ↳ Equivalent and molar conductivity relationship between them
- ↳ Variation of molar conductivity with
- ↳ Kohlrausch's law & its application

## Key concepts in chemical Bonding

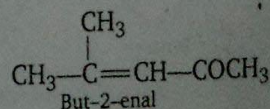
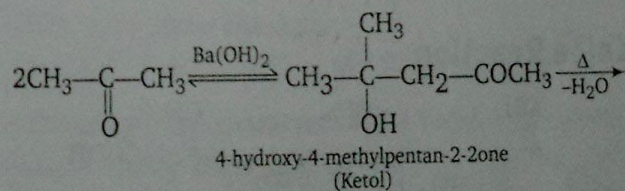
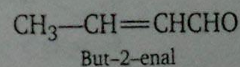
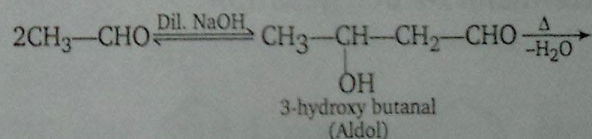
- > Reasons for bond formation is the decrease in potential energy due to attractions
- > Attainment of Octet [ $ns^2np^6$ ] is assumed to be most stable.
- > Ionic bond is formed by complete removal and acceptance of electron to form cation and anion respectively.
- > Covalent bonds is sharing of electrons.
- > Co-ordinate bond is formed between lewis acid and lewis base or electron deficient & electron rich species.

## Some Name Reaction

### > Cannizzaro Reaction

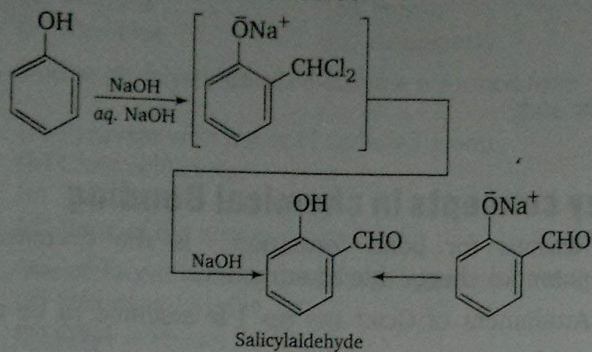


### > Aldol Condensation

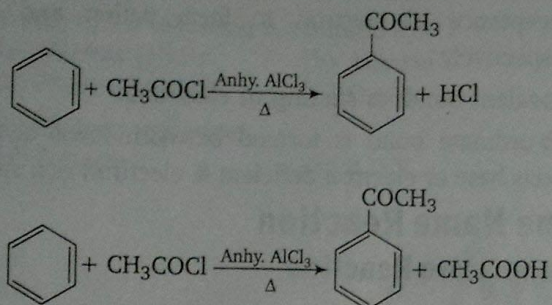




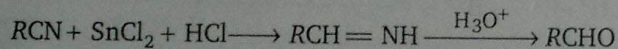
➤ **Reimer-Tiemann Reaction**



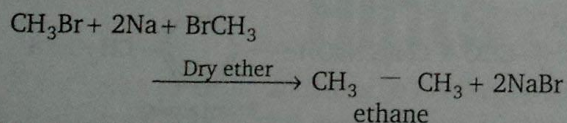
➤ **Friedel Crafts Acylation Reaction**



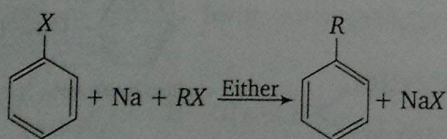
➤ **Stephen Reaction**



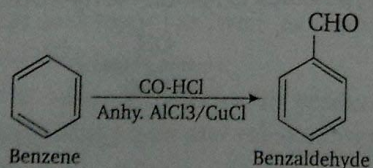
➤ **Wurtz Reaction**



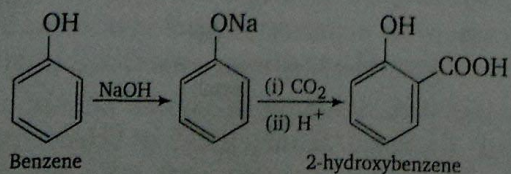
➤ **Wurtz Fittig Reaction**



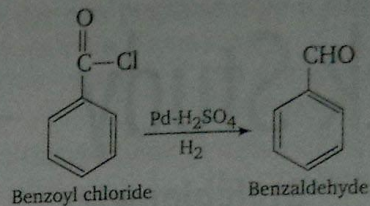
➤ **Gattermann s-Koch Reaction**



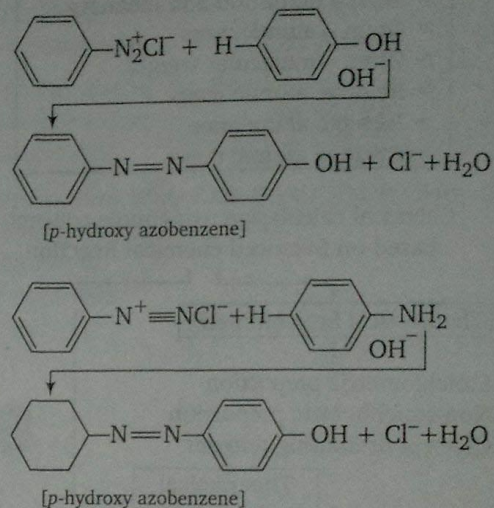
➤ **Kolbe Reaction**



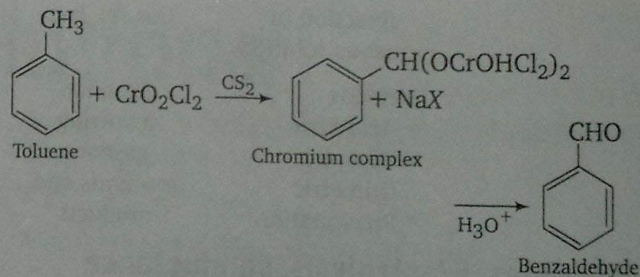
➤ **Rosenmund Reaction**



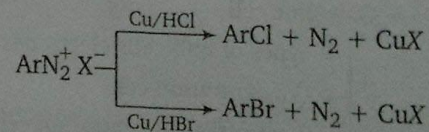
➤ **Coupling Reaction**



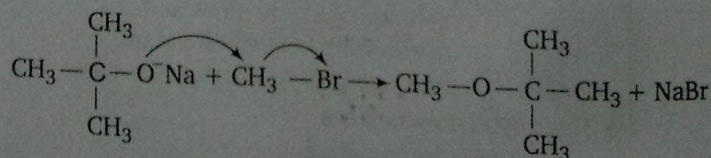
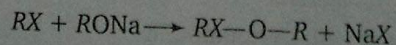
➤ **Etard Reaction**



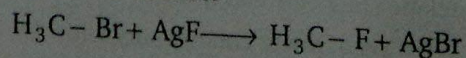
➤ **Gattermann's Reaction**



➤ **Williamson Synthesis**

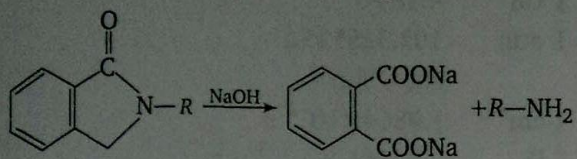
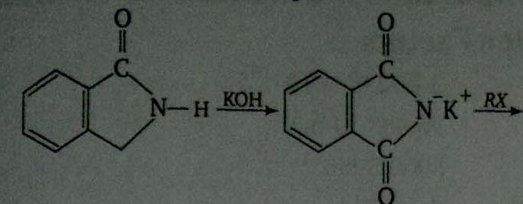


➤ **Swarts Reaction**

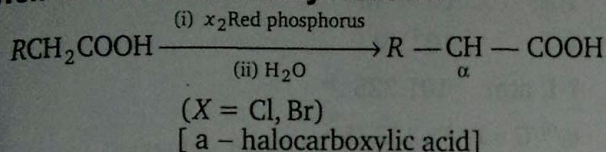




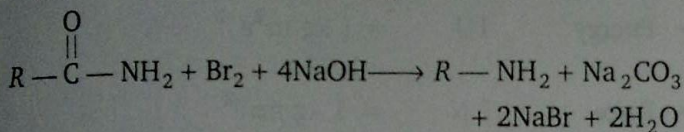
### ► Gabriel Phthalimide Synthesis



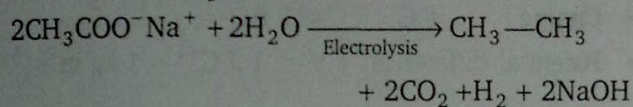
### ► Hell-Volhard-Zenlinsky Reaction



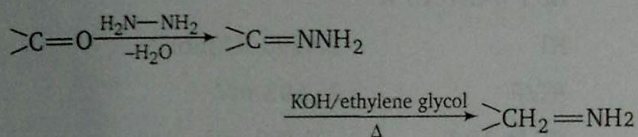
### ► Hofmann Bromamide Egradation Reaction



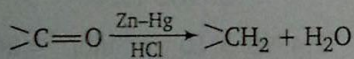
### ► Kolbe's Electrolytic Method



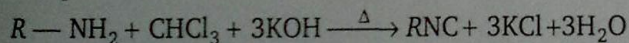
### ► Wolff-Kishner Reduction



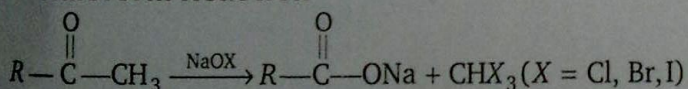
### ► Clemmensen Reduction



### ► Carbylamine Reaction

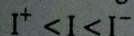


### ► Haloform Reaction

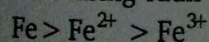


## INCREASING/DECREASING ORDER

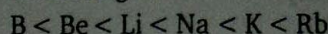
► Increasing size



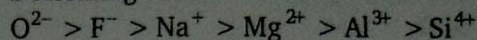
► Decreasing radii



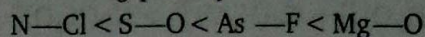
► Increasing size



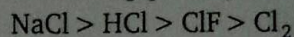
► Decreasing radii



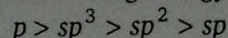
► Increasing polarity of bond



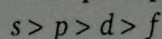
► Decreasing polarity of diatomic molecules



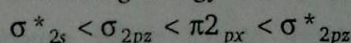
► Decreasing energy of the orbitals



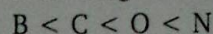
► Decreasing shielding effect of inner electrons with the same principal quantum number



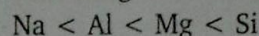
► Increasing energy of molecular orbitals



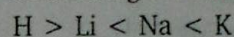
► Increasing ionization potential



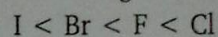
► Increasing order of first ionization potential



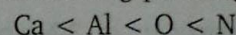
► Decreasing ionisation potential



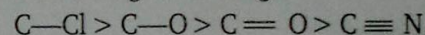
► Increasing electron affinity



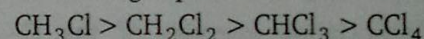
► Increasing paramagnetism



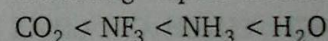
► Decreasing bond lengths



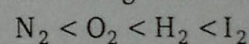
► Decreasing dipole moment



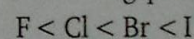
► Increasing dipole moment



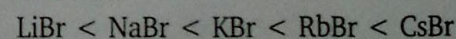
► Increasing bond strength



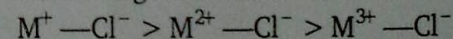
► Increasing polarizability of halogen atoms



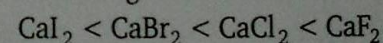
► Increasing order of ionic character of alkali metal bromides



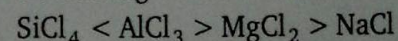
► Decreasing ionic character



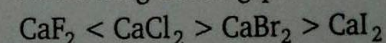
► Increasing ionic character of the halides of calcium



► Decreasing covalent character



► Decreasing melting points of calcium halides





- Increasing oxidising property  
 $I < Br < Cl < F$
- Decreasing oxidising property  
 $O > S > Se > Te$
- Decreasing acidity  
 $Fe(H_2O)_6^{3+} > Al(H_2O)_6^{3+} > Ca(H_2O)_n^{3+} > Na(H_2O)_n^+$
- Increasing acid character of metal oxides  
 $P_4O_{10} > SiO_2 > Al_2O_3 > MgO$
- Increasing order of acid strength  
 $HClO < HClO_2 < HClO_3 < HClO_4$
- Decreasing order of basicity of anions  
 $F^- > Cl^- > Br^- > I^-$
- Decreasing basic strength  
 $CH_3^- > NH_2^- > OH^- > F^-$
- Decreasing vapour pressure of 0.1 molar aqueous solution of  
 $FeCl_3 > CaCl_2 > NaCl > Glucose$
- Increasing stability of hydrides  
 $CsH < KH < NaH < LiH$
- Decreasing solubility of hydroxides  
 $Ba(OH)_2 > Sr(OH)_2 > Ca(OH)_2 > Mg(OH)_2$
- Increasing solubility of sulphates  
 $BaSO_4 < SrSO_4 < CaSO_4 < MgSO_4$
- Increasing boiling points  
 $n\text{-pentane} < \text{Neohexane} < \text{Isohexane} < \text{3-Methyl pentane}$
- Decreasing boiling point  
 $CH_3I > CH_3Cl > Cl_2 > CH_4$
- Increasing bond dissociation energies of the C–X bonds of halo-alkanes  
 $(CH_3)_3C-Cl < (CH_3)_2CHCl < CH_3CH_2Cl < CH_3Cl$
- Increasing bond angle  
 $SbH_3 < AsH_3 < PH_3 < NH_3$
- Increasing bond order  
 $H_2O_2 < N_2$