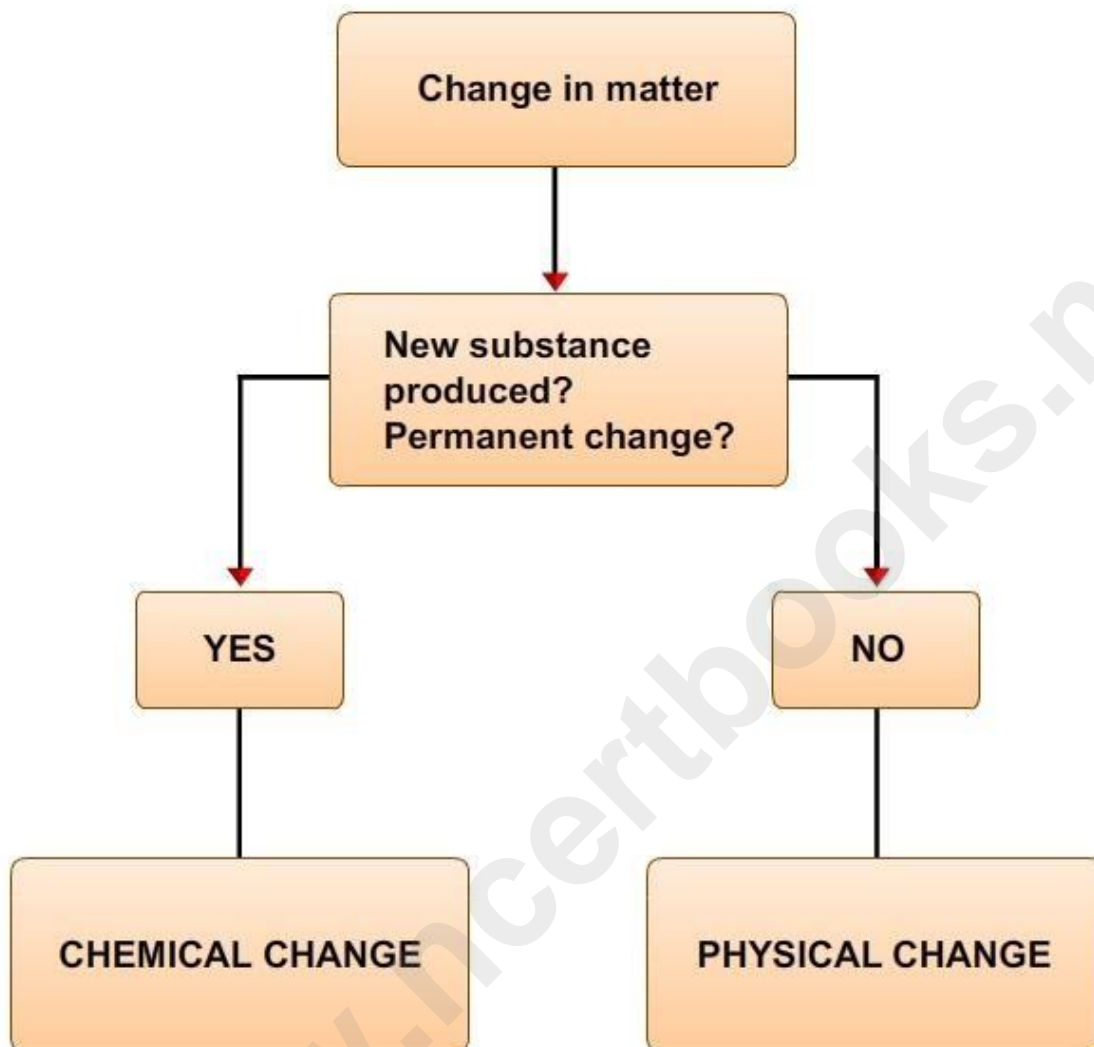
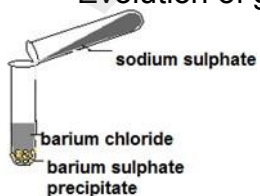


ICSE CLASS 8 LESSON 3 TRANSFORMATION OF SUBSTANCES



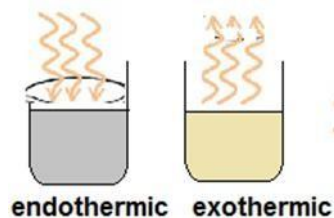
Characteristics of chemical reactions

- Evolution of gas



- Formation of precipitate

- Change of colour

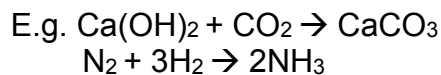
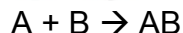


- Change in energy

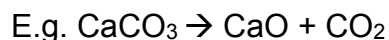


Types of Chemical reactions

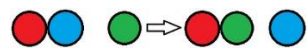
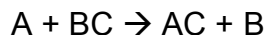
- COMBINATION REACTIONS (SYNTHESIS)



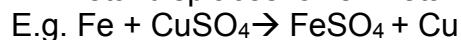
- DECOMPOSITION REACTIONS
- Three types: thermal, electrical, photochemical
- Always endothermic



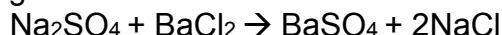
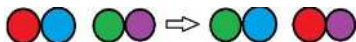
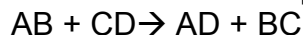
- DISPLACEMENT REACTIONS



- Depends on Activity series. Higher up metal displaces lower metal



- DOUBLE DISPLACEMENT
- Neutralization or precipitation

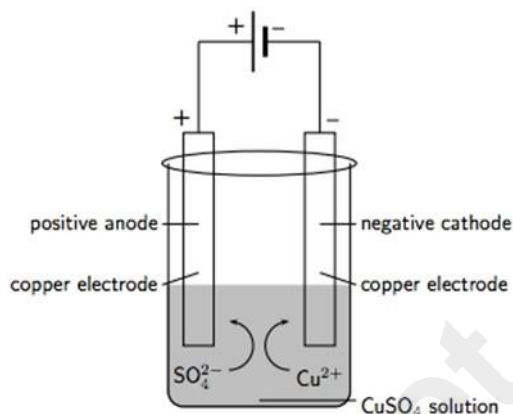


Electrolysis

Electrolysis of copper sulphate solution
Copper electrodes

Positive, anode, oxidation: No product—
anode keeps dissolving as more Cu^{2+} ions
are formed

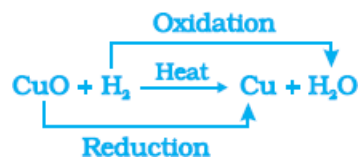
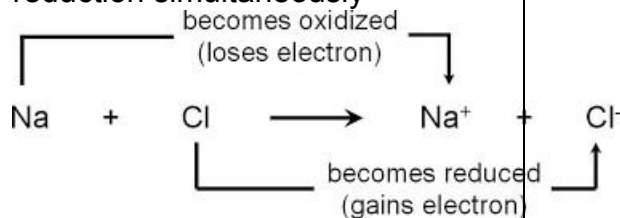
Negative, cathode, reduction: copper
 $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$



Redox reactions

Oxidation	Reduction
Addition of oxygen, loss of hydrogen	Addition of hydrogen, loss of oxygen
Loss of electrons	Gain in electrons
Oxidizing agent gets reduced	Reducing agent gets oxidised
$\text{C} + \text{O}_2 \rightarrow \text{CO}_2$	$\text{CH}_3\text{CHO} \rightarrow \text{CH}_3\text{CH}_2\text{OH}$
OIL (OXIDATION IS LOSS)	RIG (REDUCTION IS GAIN)

Redox involves oxidation and reduction simultaneously



Electroplating, electrometallurgy and electro refining are important applications of electrolysis

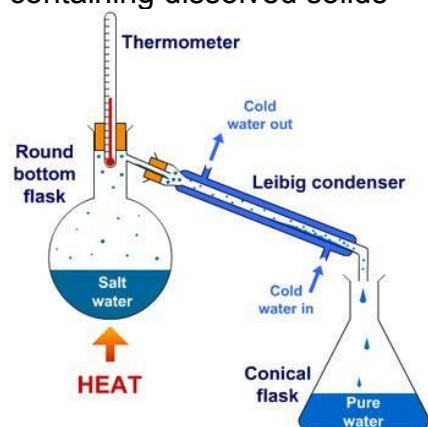
2 important definitions that characterize pure substances

- Boiling point: temperature at which liquid changes to vapour state under normal atmospheric pressure
- Melting point: temperature at which solid changes into liquid at normal atmospheric pressure

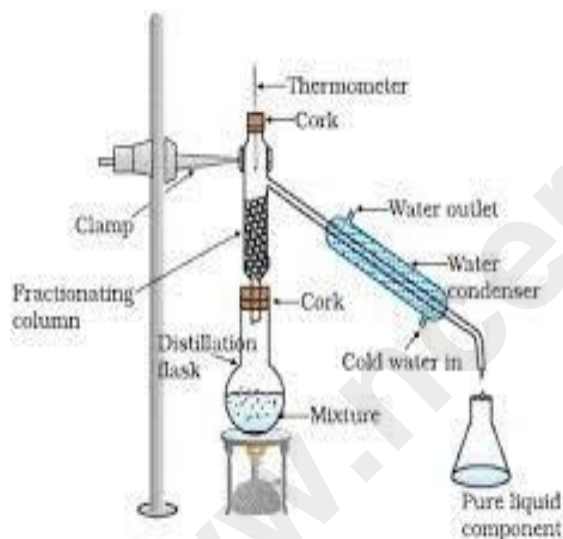
- Impurities cause increase in boiling point and decrease in melting point

Distillation

Distillation: purification of water containing dissolved solids



- Fractional distillation: separating 2 liquids with different boiling points e.g. benzene; toluene



Chemical Equations and calculations based on them

Chemical Equations and calculations based on them

Reactants undergo chemical reaction → Products

Reaction is given in the form of an equation. This equation needs to be balanced

Count the number of atoms of each element on both sides of the equation
 Multiply both sides with appropriate numerals to ensure that the number of atoms of each element is the same on both sides. Always add numbers as a

prefix, never change the formula of the compound

Example 1

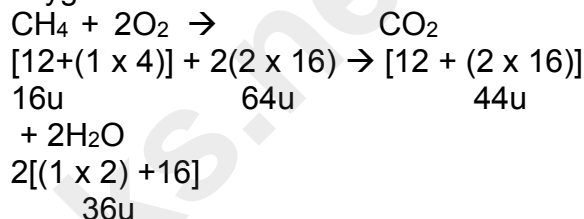
Calculate the molecular mass of CaCO_3

Atomic mass of Calcium=40; C=12; O=16

Molecular mass= $40 + 12 + (3 \times 16) = 40+12+48 = 100\text{u}$

Example 2

Calculate the amount of CO_2 formed when 8g of methane completely burns in oxygen



Or $16\text{g} + 64\text{g} \rightarrow 44\text{g} + 36\text{g}$

16g of methane burns completely to give 44g of carbon dioxide

8g will burn to give $8 \times \frac{44}{16} = 22\text{g}$

Example 3

What is the loss in mass if 50g of calcium carbonate is heated to give calcium oxide?

