Chemistry chapter 8
chemical analysis

Purity

- In everyday life pure means nothing mixed for example pure milk
- In chemistry appear substance contains one element or one compound no other substances

Testing purity

- Pure substances have fixed melting point or boiling point
- to check purity means mayor the melting or boiling point and compare it with the known value

Impurities

- Lower the melting point
- make the melting point range wider
- increase the boiling point
- make It boil over range of temperatures

Formulations

- Formulation is a mixture made with exact amounts of each component
- It is design for specific purpose and each part helps the product work properly

Example paint

- Pigment -It gives colour for example titanium oxide for white paint
- Solvent- dissolves other chemicals and controls thickness
- Binder= forms a solid film that holds the pigment
- additives= improve properties which is faster drawing waterproofing

Why formulations matter

- Used in medicines. cleaning products fuels cosmetics fertilizers alloys food
- In medicine formulation help the drugs reach the right part of the body in the right amount and stay stable for long time

Tests for the common gases

Chlorine

- it turns the app Litmus Paper white
- it may turn red first because chlorine is acidic

oxygen

Glowing splint relights in oxygen

Carbon dioxide

when bubbled through lime water it turns milky or cloudy

Hydrogen

a burning splint makes squeaky pop

Collecting gases

- Haveir then air and collect in an upright tube
- Lighter than air and it is collected in upside down tube

Chromatography

It is a method used to separate and identify the components of mixture of soluble substance

Uses of chromatography are to test the purity of substance to separate different pigment colours with ink or paint pigments like chlorophyll

Paper chromatography

- It is a simple type of chromatography that has two phases
- Stationery phase and mobile phase
- Stationery phase means chromatography paper does not move

- mobile phase means solvent moves and carries the sample along the paper

Procedure

- draw a baseline with pencil on the paper
- place small spot of sample on the line
- or the solvent like water or ethanol into the beaker
- hand the paper so that its bottom just touch the solvent
- let the solvent moves upward and carry the pigments
- remove the paper before the solvent reaches the top
- mark the solvent front the highest point the solvent reached
- the pattern of the spots form is called chromatography

Result

each part of chromatography Represent the different substance In will mixture

Calculate rf value

- **Formula:** $R_f = \frac{\text{Distance traveled by substance}}{\text{Distance traveled by solvent}}$.
- **Calculation:** Measurements are taken from the pencil start line (origin) to the center of the spot and to the furthest edge of the solvent (solvent front).
- **Identification:** An unknown component's R_f value is compared to known, standard R_f values to identify it.
- **Dependency:** R_f values are specific to the solvent used and the material of the stationary phase (e.g., paper or TLC plate).
- **Relative R_f:** If experimental conditions (temperature, solvent) are not consistent, relative R_f values (compared to a standard on the same plate) are used.