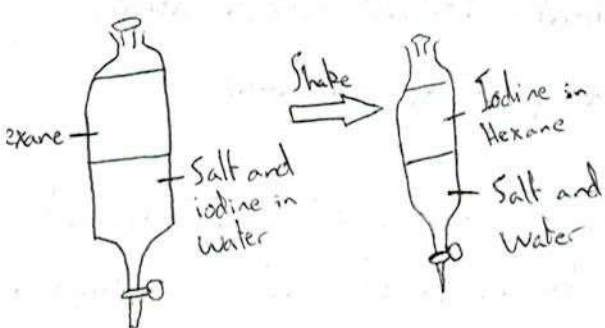
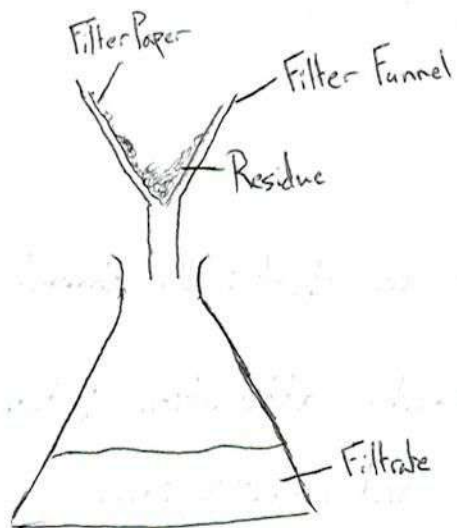
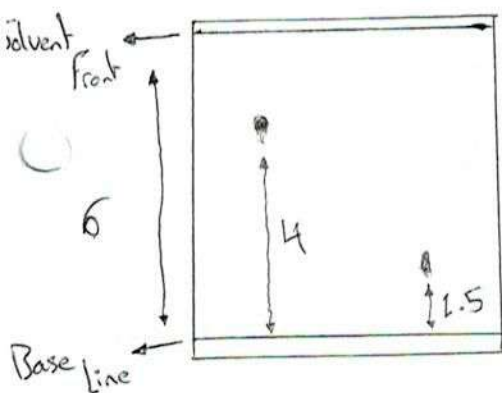
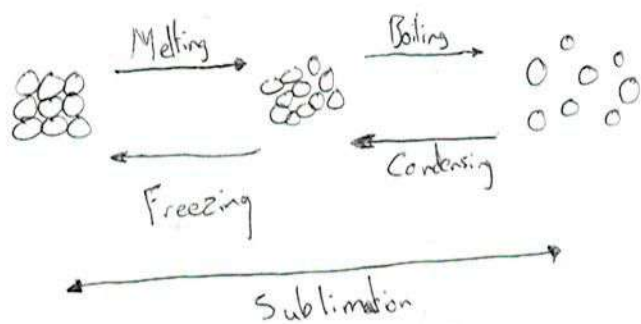


# Unit 1 - Particles and Purification



Brownian motion - random, irregular movement of particles also known as Diffusion

Sublimation - direct change from solid to gas or gas to solid

$R_f$  - used to identify compounds on a chromatogram

$$R_f = \frac{\text{Distance from base to center}}{\text{Distance of solvent front}}$$

Pure substance - Melts and boils at definite temperatures

Decanting - pouring off the solution

Centrifuge - a machine that spins really fast, pulling the solid to the bottom so the liquid can be decanted

Fractional distillation - used to separate a mixture of liquids with different boiling points such as ethanol and water

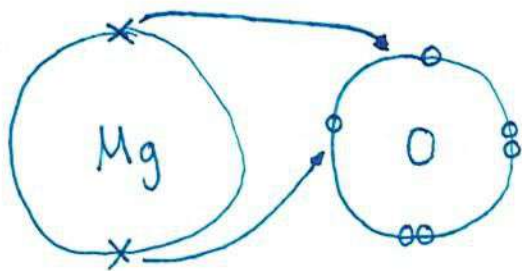
## Unit 2 - Atoms, elements and compounds

Subatomic Particle	Symbol	Relative mass	Relative charge
Proton	P	1	+1
Neutron	n	1	no charge
electron	e	0.00054	-1

**Isotopes** - atoms with the same number of protons but a different nucleon number

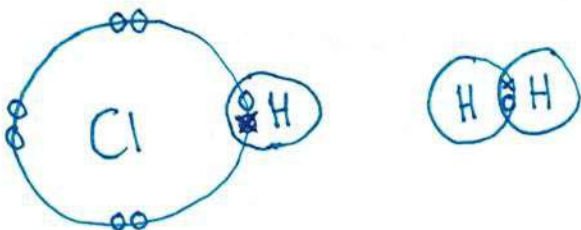
**Radioisotopes** - radioactive isotopes that decay over time. Can be used to treat cancer

## Unit 3 - Structure and bonding



**Ion** - an electrically charged particle

**Ionic bond** - attraction between the positive and negative ions



**Covalent bond** - formed when atoms share a pair of electrons

- Compounds of metals and non-metals are likely to be ionic, and a compound of 2 non-metals is covalent

## Unit 4 - Formulae and equations

Compound ions:

$\text{NH}_4^+$   
ammonium  
ion

$\text{OH}^-$   
hydroxide  
ion

$\text{NO}_3^-$   
nitrate  
ions

$\text{CO}_3^{2-}$   
carbonate  
ion

$\text{SO}_4^{2-}$   
sulfate  
ions

$\text{HCO}_3^-$   
hydrogencarbonate  
ion

How to work out the formula  
of compounds:

Magnesium  
Chloride

Valencies Mg Cl  
2 1

Formula  $\text{MgCl}_2$

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## Unit 5 - Chemical calculations

$$\text{NO of moles} = \frac{\text{Mass of substance}}{\text{Mass of one mole of the substance}}$$

$$\frac{\text{Mass}}{M_r \times \text{Mole}}$$

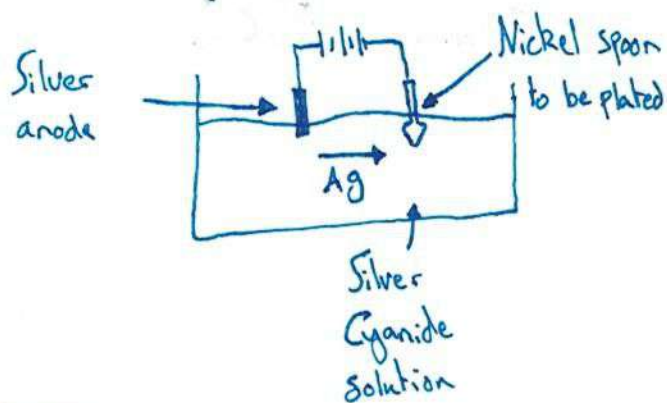
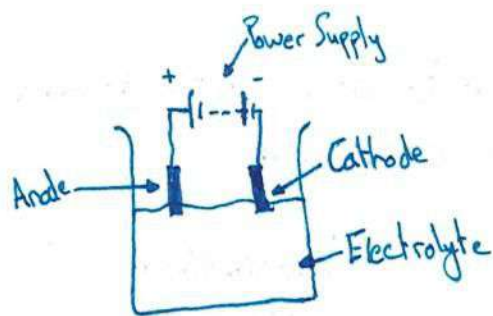
$$\text{Purity} = \frac{\text{Mass of pure}}{\text{Mass of impure}}$$

$$\text{Ans} \times 100 = \% \text{ Purity}$$

$$\text{Yield} = \frac{\text{Actual yield}}{\text{Predicted yield}}$$

$$\text{Ans} \times 100 = \% \text{ Yield}$$

## Unit 6 - Electrolysis



Electrolysis - breakdown of ionic compounds by the passage of electricity

Discharge series:-

For positive ions:  $\text{Na}^+$   $\text{Mg}^{2+}$   $\text{Al}^{3+}$   $\text{H}^+$   $\text{Cu}^{2+}$

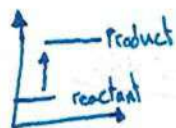
More likely to be discharged  $\rightarrow$

For negative ions:  $\text{SO}_4^{2-}$   $\text{NO}_3^-$   $\text{OH}^-$   $\text{Cl}^-$   $\text{Br}^-$   $\text{I}^-$

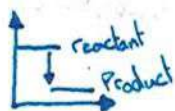
Electroplating - coating with a metal to improve appearance or protect it

## Unit 7 - Chemical changes

Endothermic - Energy in the reactants is less



Exothermic - Energy in the reactants is greater



## Unit 8 - Rate of reaction

To increase the rate of a reaction:

- Increase the surface area
- Increase the concentration
- Increase the temperature
- Adding a catalyst

## Unit 9 - Chemical reactions

In an equilibrium reaction:

- Products are favoured if there is an increase in the concentration of the reactant
- The reaction will favour the lowest number of gas molecules if pressure is increased

Equilibrium reaction - forward and reverse reactions happen at the same time

Redox reaction - when both oxidation and reduction happen at the same time

## Unit 10 - Acids and Bases

Acids - substances that form hydrogen when dissolved in water

pH scale - shows acidity or alkalinity of a solution

Acid, Metal + Acid



Oxides - compounds of metals or non-metals with oxygen

### Acidic Oxides

- Usually non-metal oxides
- React with alkali to form salt and water

### Neutral Oxides

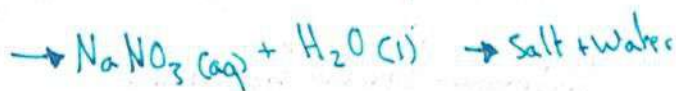
- Do not react with acids or bases
- Lower oxides of non-metals

Bases - substances that dissolve in water to form hydroxide ions and can neutralize acids

Universal indicator - used to find pH of a solution

Litmus - an indicator

Base



### Basic Oxides

- Formed by direct combination
- React with acids to produce salt and water
- Do not react with water

### Amphoteric Oxides

- Have both acidic and basic properties
- Form salts when they react with acids and alkalis

Unit-11 Making salts

- Salts can be made by the reaction of an acid with an insoluble base

- A titration is used to obtain a soluble salt from an acid and alkali

- Most chlorides, bromides and iodides are soluble. Those from lead and silver are insoluble

How to identify a gas

Oxygen - relights a splint

$CO_2$  - turns limewater milky

Hydrogen - squeaky pop with a lighted splint

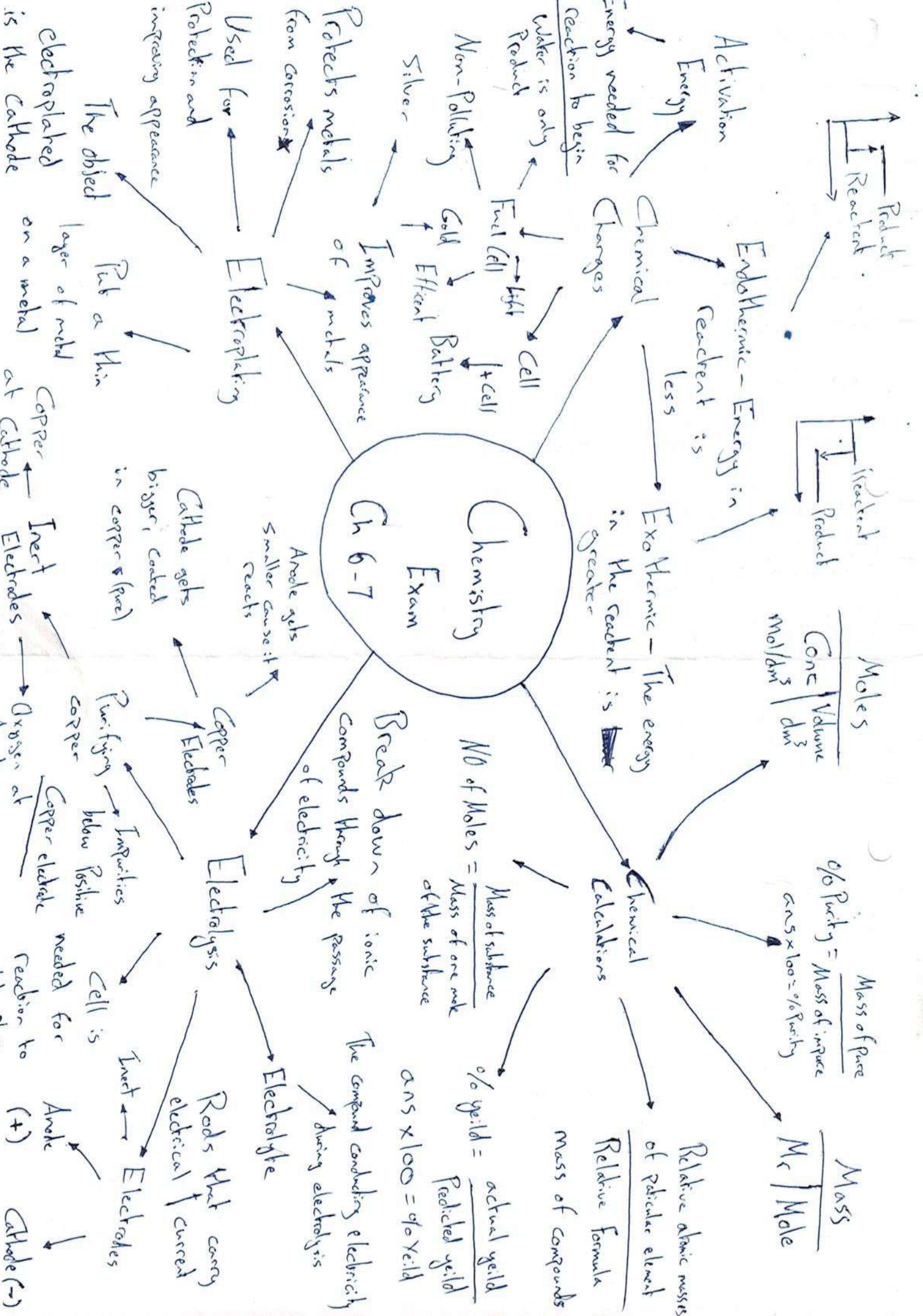
Ammonia - turns litmus paper blue

Chlorine - bleaches damp litmus paper

$SO_4$  - turns potassium manganate colourless

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# Chemistry Exam



# Chemistry

- Moles, Mr and Mass ✓
- Ionic / Covalent Bonding ✓
- Balancing equations ✓
- Electrolysis ✓
- Electroplating ✓
- Physical and chemical changes ✓
- Energy Transfer ✓
- Electrochemical Cells ✓
- Fuel Cells ✓