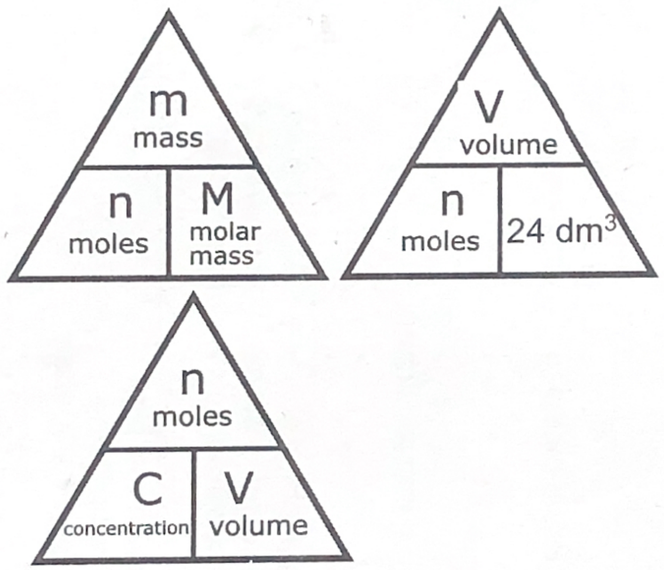
Practical Summary Notes

<table>
<tr><th></th><th>Titration</th><th>Gravimetric</th><th>Chemical Energetic</th><th>Rate of reaction</th></tr>
<tr><td>Data recording</td><td>• Burette: 2 decimal places
• 2nd decimal place is either '0' or '5'</td><td>• Electronic Balance: 2 decimal places</td><td>• Thermometer: 1 decimal place
• 2nd decimal place is either '0' or '5'</td><td>• Stopwatch: nearest seconds
• No decimal place</td></tr>
<tr><td>Units</td><td>• cm^3</td><td>• g</td><td>• ^oC</td><td>• min or s</td></tr>
<tr><td>Concept(s) that is/are usually involved</td><td colspan="2">Mole Concept
Formulae
 

Steps:
1. Balanced equation
2. No. of moles
3. Mole ratio
4. Solve

All final answers to be given to 3 significant figures.</td><td>Temperature change =
Final Tempt – Initial Tempt

<table><tr><td>If
• Final T> Initial T
• Temperature change (+ value)</td><td>Exothermic reaction</td></tr><tr><td>If
• Final T< Initial T
• Temperature change (- value)</td><td>Endothermic reaction</td></tr></table></td><td>Rate of reaction

Collision theory
<table><tr><td>Increase in temperature</td><td rowspan="3">Increase in rate of reaction</td></tr><tr><td>Increase in concentration</td></tr><tr><td>Decrease in particle size (powder)</td></tr></table>
<table><tr><td>decrease in temperature</td><td rowspan="3">Decrease in rate of reaction</td></tr><tr><td>decrease in concentration</td></tr><tr><td>increase in particle size (granules/ blocks)</td></tr></table></td></tr>
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Qualitative Analysis

Common Tests Carried Out

	Test	Observation
(a)	Add about 1 cm depth of **P** into a boiling tube. Add aqueous sodium hydroxide slowly with shaking, until no further change is seen. ***(test for cation)*** Add a further 1 cm depth of aqueous sodium hydroxide and gently <u>heat the mixture</u>. ***(test for ammonium ion)*** Test the gas evolved with damp red litmus paper.	A _(colour)_ ppt is formed, soluble/insoluble in excess NaOH. A pungent gas is produced, turns moist red litmus paper blue. Ammonia gas is produced.
(b)	Add about 1 cm depth of **P** into a boiling tube. Add aqueous sodium hydroxide slowly with shaking, until no further change is seen. ***(test for cation)*** Add alumium foil to the boiling tube and gently <u>heat the mixture</u>. ***(test for nitrate ion)*** Test the gas evolved with damp red litmus paper.	A _(colour)_ ppt is formed, soluble/insoluble in excess NaOH. A pungent gas is produced, turns moist red litmus paper blue. Ammonia gas is produced.
(c)	To a test-tube, add 1 cm depth of solution **P** followed by an equal volume of dilute nitric acid. ***(test for carbonate ion)***	Bubbles are formed gives white ppt with limewater. Carbon dioxide gas is produced.
(d)	To the sample of the mixture of **P** and nitric acid, add an equal volume of aqueous barium nitrate. ***(test for sulfate ion)***	A white ppt is formed.
(e)	To the sample of the mixture of **P** and nitric acid, add an equal volume of aqueous silver nitrate. ***(test for chloride ion)***	A white ppt is formed.

(f)	To a test-tube, add 1 cm depth of solution **P** followed by two pieces of magnesium ribbon/ zinc granules. ***(bubbles will be formed→ test for hydrogen gas)***	- Bubbles are formed, extinguish a lighted splint with a pop sound. Hydrogen gas is produced. - A _(colour)_ solid is formed. - _(colour)_ solution turns _(colour)_.
(g)	To a test-tube, add 1 cm depth of solution **P** followed by an equal volume of **hydrogen peroxide**. ***(bubbles will be formed→ test for oxygen gas)***	Bubbles are formed, relights a glowing splint. Oxygen gas is produced.

When answering conclusions and evidence questions:

Example:

Consider the results of the experiments you have performed. Give two conclusions about the ions and gases involved in these reactions.

Give evidence to support each of your conclusions.

Conclusion 1: *when writing your answer, please either give the chemical formula of the ion (eg Cu^{2+}) or spell out the name of the ion (eg copper(II) ion).*

Please do not give answers such as ***copper; copper ion Cu(II) ions*** *which are in accurate or inappropriate.*

Evidence: *when writing the evidence, please give the test conducted followed by the results.*

Example:

Test conducted

When sodium hydroxide is added to the solution P, a blue ppt is formed, insoluble in excess sodium hydroxide.

Results of test