Chemistry 5.3 – Quantitative Chemistry

Content	RAG
Recall the law of conservation of mass	
Calculate the relative formula mass of a compound.	
Give examples of reactions that appear to involve a change in mass and explain why the mass appears to change.	
Explain what is meant by measurement uncertainty, use distribution and range to estimate and measure uncertainty	
Recall that chemical amounts are measured in moles. Know about the Avogadro constant & its value. (HT only)	
Recall that the mass of one mole of a substance in grams is equal to its relative formula mass. (HT only) Use Mr to calculate the number of moles and vice versa	
Interpret chemical equations in terms of moles. (HT only)	
Calculate the masses of substances shown in a balanced symbol equation. (HT only)	
Calculate the masses of reactants and products from the balanced symbol equation and the mass of a given reactant or product. (HT only)	
Balance equations using masses and moles. (HT only)	
State what is meant by "limiting reactants" and "reactant in excess". Explain the effect of limiting a reactant. (HT only)	
Recall that the concentration of a solution can be measured in mass per given volume of solution, eg grams per dm^3 (g/dm^3). Calculate the mass of a solute in a given volume of a solution	
Recall that concentration can be measured in $mol/dm^{3,}$ use this in calculations of mass and concentration.	
Explain how the mass of a solute and the volume of a solution is related to the concentration of the solution. (HT only)	
Explain why it is not always possible to obtain the calculated amount of product from a reaction. Define and calculate percentage yield	
Calculate the theoretical mass of a product from a given mass of reactant and the balanced equation for the reaction. (HT only)	

Define atom economy, explain its importance and calculate atom economy using the balanced equation.	
explain why a particular reaction pathway is chosen to produce a specified product given appropriate data such as atom economy (if not calculated), yield, rate, equilibrium position and usefulness of by-products (HT only)	
Recall that equal amounts in moles of gases occupy the same volume under the same conditions of temperature and pressure.	
Recall that the volume of one mole of any gas at room temperature and pressure (20oC and 1 atmosphere pressure) is 24 dm3.	
Recall that the volumes of gaseous reactants and products can be calculated from the balanced equation for the reaction.	
Calculate the volume of a gas at room temperature and pressure from its mass and relative formula mass	
Calculate volumes of gaseous reactants and products from a balanced equation and a given volume of a gaseous reactant or product.	
Change the subject of a mathematical equation.	

Text in italics = higher tier only.