

TOPIC 1 STUDY GUIDE – STOICHIOMETRY

1.1 Introduction to the particulate nature of matter and chemical change

Essential idea: Physical and chemical properties depend on the ways in which different atoms combine.

- Deduction of chemical equations when reactants and products are specified.
- Application of the state symbols (s), (l), (g) and (aq) in equations.
- Explanation of observable changes in physical properties and temperature during changes of state.

1.2 The mole concept

Essential idea: The mole makes it possible to correlate the number of particles with the mass that can be measured.

- Calculate the molar masses of atoms, ions, molecules and formula units.
- Solution of problems involving the relationships between the number of the amount of substance in moles and the mass in grams.
- Interconversion of the percentage composition by mass and the empirical formula.
- Determine the molecular formula of a compound from its empirical formula and molar mass.
- Obtain and use experimental data for deriving empirical formulas from reactions involving mass changes.

1.3 Reacting masses and volumes

Essential idea: Mole ratios in chemical equations can be used to calculate reacting ratios by mass and gas volume.

- Solution of problems relating to reacting quantities, limiting and excess reactants, theoretical, experimental and percentage yields. Calculation of reacting volumes of gases using Avogadro's law..
- Solution of problems and analysis of graphs involving the relationship
- Solution of problems relating to the ideal gas equation.
- Explanation of the deviation of real gases from ideal behaviour at low temperature and high pressure.
- Obtaining and using experimental values to calculate the molar mass of a gas from the ideal gas equation.
- Solution of problems involving molar concentration, amount of solute and volume of solution.