

Unit-III Exam Outline**I. Mole Conversions (Chapter 8)—Know how to:**

- A. Determine and correctly use Avogadro's number, formula mass, molar mass, molar volume at STP (and the meaning of STP) in mole-conversion problems.
- B. Determine empirical and molecular formulas given sufficient information.
- C. Calculate percentage composition from a formula or given information.
- D. Determine the molarity (concentration) of a solution given its volume and mass or moles of solute.
- E. Use the dilution formula, $M_1V_1 = M_2V_2$, to find volumes or molarities of dilute or concentrated solutions.

II. Reactions (Chapter 9)—Know how to:

- A. Balance chemical equations.
- B. Write and balance chemical equations from word equations.
- C. Predict products given reactant(s) based on the five reaction types, activity series of metals, and whether a solid, a gas, or water forms.

III. Stoichiometry (Chapter 10)—Know how to:

- A. Do stoichiometry—Using a balanced equation and molar ratio, calculate how much of a product should be produced, or reactant used up and/or left over, based on the amount(s) of a reactant or product given.
- B. Determine the limiting reactant and maximum amount of yield, when given two reactant quantities.
- C. Calculate the percent yield of a reaction using stoichiometry (expected yield) and empirical data (actual yield from the lab, for example).

IV. Thermochemistry (Chapter 11)—Know how to:

- A. Define and understand heat, system, surroundings, endothermic, exothermic, enthalpy change (ΔH), specific heat, calorimetry, etc.
- B. Do calorimetry problems: Using $q = m \times C \times \Delta T$ and moles of reactant, find ΔH (in kJ/mol).
- C. Do specific heat problems (using $q = m \times S \times \Delta T$).
- C. Do enthalpy-change problems (stoichiometry using ΔH).
- D. Do problems involving Hess's law of heat summation.
- E. Do heat of phase change problems using a heating curve.