EXAM-DAY · 90-MIN REVISION CARD

Some Basic Concepts of Chemistry

Print this · Fold it · Carry to the exam-hall gate · Revise once · Then walk in.

FORMULAS & KEY RESULTS

- Moles: n = given mass / molar mass = number of particles / 6.022 x 10^23
- Avogadro number: N_A = 6.022 x 10^23 particles per mole
- Molar volume: 1 mol of any gas at STP (273.15 K, 1 bar) occupies 22.7 L (22.4 L at 1 atm)
- Molarity: M = moles of solute / volume of SOLUTION in litres (temperature-DEPENDENT)
- Molality: m = moles of solute / mass of SOLVENT in kg (temperature-INDEPENDENT)
- Mole fraction: x_A = n_A / (n_A + n_B); x_A + x_B = 1
- Mass percent: % of A = (mass of A / total mass of solution) x 100
- % composition: % of element = (atoms x atomic mass / molar mass) x 100
- Molecular formula = (empirical formula) x n, where n = molar mass / empirical formula mass
- Average atomic mass = sum of (isotope mass x fractional abundance)
- Stoichiometry chain: mass -> mole (divide by M) -> ratio (balanced eqn) -> mole -> mass (x M)

TOP 5 PYQ PATTERNS

1 Moles / molecules / atoms from a given mass
3 marks · 90% of years
n = mass/M; multiply by 6.022 x 10^23 for molecules; multiply again by atoms-per-molecule for atoms.

2 Molarity or molality of a solution
3 marks · 75% of years
Molarity uses litres of solution; molality uses kg of solvent. Watch g->kg and mL->L conversions.

3 Limiting reagent + mass of product
5 marks · 60% of years
Compare coefficient-scaled moles, NOT grams. Compute product from the limiting reagent only.

4 Empirical / molecular formula from % composition
3 marks · 55% of years
% -> moles (/atomic mass) -> divide by smallest -> whole-number ratio; n = M / empirical mass.

5 State and verify a law of chemical combination
3 marks · 50% of years
Name the law, state it precisely, then show the given data obeys the constant/whole-number ratio.

90-MIN REVISION FLOW

0-15 min
Recite the mole bridge: mass /M -> mole xN_A -> particles. Solve: moles in 36 g H2O (ans 2), molecules in 8 g O2 (ans 1.5055 x 10^23).

15-30 min
Re-derive molar masses from memory: H2O=18, CO2=44, NaOH=40, H2SO4=98, glucose C6H12O6=180, CaCO3=100.

30-45 min
Solve one molarity (4 g NaOH in 250 mL -> 0.4 M) and one molality (a) problem; state which is temperature-independent and WHY.

45-60 min
Work the limiting-reagent template: 28 g N2 + 10 g H2 -> NH3. Confirm N2 limiting, product = 34 g NH3.

60-75 min
Derive empirical formula of a 40% C, 6.7% H, 53.3% O compound (ans CH2O); if M=180, molecular = C6H12O6.

75-90 min
Take the 15-MCQ Quick Drill under a 25-minute timer. Target >= 12/15, then re-read every wrong answer's notes-slide.

Confidence, not anxiety. You've practised this all year. Trust your steps. Don't change strategy on exam morning.
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