EXAM-DAY · 90-MIN REVISION CARD

Atoms and Molecules

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

FORMULAS & KEY RESULTS

- Number of moles n = mass (g) / molar mass (g·mol^{-1})
- Number of particles N = n × N_A where N_A = 6.022 × 10^{23} mol^{-1}
- Mass m = n × molar mass
- Molecular mass = Σ (atomic mass × number of atoms) summed over all elements
- Formula unit mass — used for ionic compounds (NaCl, MgO, $CaCO_3$)
- 1 mole of any substance contains 6.022 × 10^{23} particles
- Molar mass numerically equals atomic/molecular mass but in grams (g·mol^{-1})
- Valency rule — for Groups 1, 2, 13: valency = group last digit; for Groups 15-17: valency = 8 – valence electrons
- Criss-cross method for formula writing — swap valencies as subscripts (Al^{3+} + O^{2-} → Al_2O_3)
- Polyatomic ions — write the GROUP in brackets if subscript > 1: $Ca(NO_3)_2$, $Al_2(SO_4)_3$
- Atomicity: monoatomic (noble gases, metals), diatomic (H_2, O_2, N_2, Cl_2), triatomic (O_3), polyatomic (P_4, S_8)

TOP 5 PYQ PATTERNS

1 Mole calculation — given mass, find number of moles, atoms or molecules
3 marks · 88% of years
Write n = m/M. Compute molar mass. Multiply by N_A for particles. Show all three steps with units.

2 Molecular / formula unit mass calculation of a given compound
2 marks · 80% of years
List atomic masses, multiply by number of atoms, sum. Always quote atomic masses you used.

3 Law of Conservation of Mass — state + verify with numerical example
3 marks · 72% of years
State the law + add reactant masses + add product masses + show equality.

4 Write chemical formulae using valencies (4-5 compounds asked)
2 marks · 65% of years
Criss-cross method. Polyatomic ions go in brackets when subscript >1: $Ca(NO_3)_2$.

5 Postulates and limitations of Dalton's atomic theory
3 marks · 55% of years
Any 3 postulates (1 mark) + any 2 limitations (1.5 marks) + how modern theory accounts for them (0.5 mark).

90-MIN REVISION FLOW

0-10 min
Memorise N_A = 6.022 × 10^{23} and the three master formulas n = m/M, N = n × N_A, m = n × M

10-25 min
Compute molecular masses of 10 common compounds: H_2O, CO_2, NH_3, H_2SO_4, NaOH, $CaCO_3$, NaCl, KCl, MgO, Al_2O_3

25-45 min
Solve 5 mole-conversion numericals — mass→moles, moles→atoms, mass→molecules — verify each answer

45-60 min
Practise writing formulae by criss-cross for: magnesium chloride, calcium oxide, aluminium sulphate, potassium nitrate, sodium carbonate

60-75 min
Write Dalton's postulates + two limitations from memory and check against the cheat sheet

75-90 min
Attempt the 15-question Drill MCQ paper as a timed sprint (15-min target)

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