2 Atoms, molecules and moles – Part 2 — Answers

Answers

Work through these after trying the questions yourself.

2.1 24.0 dm^3.
2.2 $V = n \times 24 = 0.25 \times 24 = 6.0$ dm^3.
2.3 moles C $= 6.0/12 = 0.50$; ratio 1 : 1, so 0.50 mol CO_2; mass $= 0.50 \times 44 = 22$ g.
2.4 The reactant that runs out first; it decides how much product forms.
2.5 $n = cV = 0.200 \times (25.0/1000) = 5.00 \times 10^{-3}$ mol.
2.6 moles HCl $= 0.100 \times (25.0/1000) = 2.50 \times 10^{-3}$; ratio 1 : 1, so same moles NaOH; $c = n/V = 2.50 \times 10^{-3}/(20.0/1000) = 0.125$ mol dm^{-3}.

2.7 moles $H_2 = 4.0/2 = 2.0$; moles $O_2 = 16/32 = 0.50$. The equation needs 2 mol H_2 per 1 mol O_2, so 0.50 mol O_2 needs only 1.0 mol H_2. There is 2.0 mol H_2 (in excess), so O_2 is the limiting reagent.