Edexcel AS Chemistry Exam practice answers

5: Formulae, equations and amount of substance

1 (a) (i) The Avogadro constant is the number of carbon-12 atoms (✓) in exactly 12¦g of carbon-12 (✓)

 (ii) B (✓)

 (b) A (✓)

 (c) (i) 0.0535¦mol; (✓) (ii) 0.0779¦mol; (✓) (iii) 0.0329¦mol; (✓) (iv) 0.003¦56¦mol (✓)

2 (a) (i) % ÷ *A*r ÷ smallest

 carbon 82.6 6.88 1

 hydrogen 17.24 17.24 2.5 (✓)

 empirical formula is C2H5 (✓)

 (ii) (24 + 5) is half 58, so molecular formula is C4H10 (✓)

3 (a) Amount of NaOH = 0.10¦mol; amount of H2SO4 needed = 0.050¦mol (✓)

 Amount of H2SO4 taken = 0.0510; (✓) so NaOH is the limiting reagent (✓)

 Mass of Na2SO4 = ½ × 0.10 × 142.1 = 7.11¦g (✓)

 (b) A (✓)

 (c) (i) 0.02745 × 0.111 = 0.003050¦mol (✓)

 (ii) Amount in 25¦cm3 = ½ × 0.003¦050 = 0.001¦532¦mol; (✓) amount taken = 0.015¦32¦mol (✓)

 (iii) Mass of H2SO4 = 98.1 × 0.01532 = 1.49¦g (✓)

 (iv) % composition = 95.8% (✓)

4 (a) Atom economy  (✓)

 or 

 (b) (i) Molar masses/g¦mol−1: PbCl2 = 278.2; 2 × NaCl = 117; Pb(NO3)2 = 331.2 (✓)

 Atom economy  = 62.1 % (✓)

 (ii) The right-hand side of the equation would be 2HNO3, not 2NaNO3; (✓) and that has a lower molar mass, so the atom economy would be higher (✓)

5 Amount of Bi(NO3)2 = 0.01375¦mol; (✓) amount of H2S  = 0.0206¦mol (✓)

 Volume of H2S = 0.0206 × 24 = 0.495¦dm3 = 495; (✓) cm3 (✓)

6 99¦dm3 (✓)