MARKSCHEME - SL STOICHIOMETRY

P1A Answer Key:

1.C, 2.C, 3.A, 4.C, 5.D, 6.A (H2 in excess by 1g), 7.A, 8.A, 9.C, 10.B, 11.B, 12.A, 13.A, 14.C, 15.C, 16.B, 17.B, 18.B, 19.B, 20.A, 21.A, 22.C, 23.C, 24.B, 25.A, 26.A, 27.A, 28.C, 29.D, 30.D

P1B Q1: (a) 20.24 - 18.44 = 1.80 g [1]. (b) 1.8/18 = 0.1 mol H_2O; 3.19/159.6 = 0.02 mol $CuSO_4$ [2]. (c) x = 0.1/0.02 = 5 [1].

P1B Q2: (a) 22.0 cm^3 [1]. (b) n(KHP)=0.002203; conc=0.002203/0.022 = 0.100 M [3].

P1B Q3: (a) 0.05/24.31 = 0.00206 mol [1]. (b) n=PV/RT = (101*0.052)/(8.31*293) = 0.00216 mol [2]. (c) Yield = 105% (experimental error) [1].

P2 Q1: (a) 0.60g C, 0.10g H [2]. (b) 1.5 - 0.7 = 0.8g O [1]. (c) C:0.05, H:0.1, O:0.05 → CH_2O [3].

P2 Q2: n(NaN_3)=1.0; n(N_2)=1.5. V=nRT/P = (1.5*8.31*300)/100 = 37.4 dm^3 [4].

P2 Q3: n(Fe_2O_3)=6262; n(CO)=17857. Ratio is 1:3; need 18786 mol CO. CO is limiting [3]. (b) n(Fe)=2/3 * 17857 = 11905 mol = 665 kg [2].

P2 Q4: (a) (Mass of desired product / Total mass of reactants) x 100 [1]. (b) 106 / (2*84) = 63.1% [2].

P2 Q5: (a) Volume will increase (Pressure drop has larger effect than T drop) [1]. (b) V2 = (P1V1T2)/(P2T1) = (101*10*233)/(20*298) = 39.5 dm^3 [2].

P2 Q6: (a) 5.0 cm^3 [2]. (b) Pipette 5.0 mL into flask, dilute to mark with distilled water [2].

P2 Q7: (a) 0.01 mol [1]. (b) 0.001 mol [1]. (c) 0.0045 mol $CaCO_3$ = 0.45 g [3].