Answers to 1.2 exercises

1.2 Exercise 1

1. a) 0.10 b) 0.078 c) 5500 d) 0.16 e) 0.022
2. a) 3.6 g b) 14.9 g c) 5.6 g d) 39.9 kg e) 6.8 g
3. a) 28 (N_2) b) 40 (Ca) c) 160 (Br_2) d) 28 (N_2) e) 249.6 ($CuSO_4.5H_2O$)
4. a) 1.51×10^{22} b) 3.42×10^{22} c) 1.45×10^{22} d) 2.15×10^{24}
5. a) 11.7 g b) 110 g c) 8.07 mg
6. 1.06 g
7. 729 g
8. 43.3 g, 11.0 g
9. 8.48 g, 9.81 g
10. 1000 tonnes, 527 tonnes
11. a) 51.7% b) 17.0 % c) 87.2 %
12. a) 51.7 % b) 67.4% c) 52.2 % so (b) most efficient

1.2 Exercise 2

Using molarities and concentrations:

1. 0.025
2. 5.0×10^{-3}
3. 0.079 g
4. 0.993 g
5. 0.043 $moldm^{-3}$
6. 0.24 $moldm^{-3}$
7. 30 cm^3
8. 10 cm^3
9. 0.021

Reacting masses and volumes:

1. 0.05 $moldm^{-3}$
2. 0.092 $moldm^{-3}$
3. 1.76 gdm^{-3}
4. x = 3
5. 1.04 $moldm^{-3}$
6. 459 cm^3
7. 85.2, Rb
8. x = 10

1.2 Exercise 3

1. 24.4 dm^3
2. 48.7 kPa
3. 58.5 K
4. 35.8 g
5. 31.7
6. a) 149 K, b) 149 K
7. a) 5.80 dm^3, b) 1.45 dm^3, c) 7.25 dm^3
8. 37.2 cm^3
9. a) 51.8 cm^3, b) 43.3 g, c) 3.85 dm^3
10. 0.098 g, 4.04 cm^3
11. a) 280 cm^3, b) 0.22 $moldm^{-3}$

1.2 Exercise 4

1. C_3H_6O
2. C_2H_5Br
3. C_4H_8
4. C_8H_{18}
5. C_6H_6
6. Fe_2O_3
7. 16.6 % Si, 83.4 % Cl
8. 327 kg

1.2 Exercise 5

A:

1. $NaCl$	2. $AlCl_3$	3. $(NH_4)_2SO_4$	4. $Mg(NO_3)_2$	5. MgO	6. $Cu(OH)_2$
7. Al_2O_3	8. Na_2CO_3	9. Cu_2O	10. CuO	11. $Al_2(SO_4)_3$	12. PbS
13. PbO_2	14. Ca_3N_2				

B:

1. $MgCl_2(aq) + 2AgNO_3(aq) \rightarrow Mg(NO_3)_2(aq) + 2AgCl(s)$
   $Ag^+(aq) + Cl^-(aq) \rightarrow AgCl(s)$
2. $Al_2(SO_4)_3(aq) + 6NaOH(aq) \rightarrow 2Al(OH)_3(s) + 3Na_2SO_4(aq)$
   $Al^{3+}(aq) + 3OH^-(aq) \rightarrow Al(OH)_3(s)$
3. $BaCl_2(aq) + Na_2SO_4(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$
   $Ba^{2+}(aq) + SO_4^{2-}(aq) \rightarrow BaSO_4(s)$
4. $H_2SO_4(aq) + 2NaOH(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(l)$
   $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$
5. $CuSO_4(aq) + 2KOH(aq) \rightarrow Cu(OH)_2(s) + K_2SO_4(aq)$
   $Cu^{2+}(aq) + 2OH^-(aq) \rightarrow Cu(OH)_2(s)$
6. $Pb(NO_3)_2(aq) + 2HCl(aq) \rightarrow PbCl_2(s) + 2HNO_3(aq)$
   $Pb^{2+}(aq) + 2OH^-(aq) \rightarrow PbCl_2(s)$
7. $CaCl_2(aq) + H_2SO_4(aq) \rightarrow CaSO_4(s) + 2HCl(aq)$
   $Ca^{2+}(aq) + SO_4^{2-}(aq) \rightarrow CaSO_4(s)$
8. $CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$
   $CaCO_3(s) + 2H^+(aq) \rightarrow Ca^{2+}(aq) + CO_2(g) + H_2O(l)$
9. $H_2SO_4(aq) + Na_2CO_3(aq) \rightarrow Na_2SO_4(aq) + CO_2(g) + H_2O(l)$
   $2H^+(aq) + CO_3^{2-}(aq) \rightarrow CO_2(g) + H_2O(l)$
10. $CaCl_2(aq) + Na_2CO_3(aq) \rightarrow 2NaCl(aq) + CaCO_3(s)$
    $Ca^{2+}(aq) + CO_3^{2-}(aq) \rightarrow CaCO_3(s)$
11. $NH_3(g) + HNO_3(aq) \rightarrow NH_4NO_3(aq)$
    $NH_3(g) + H^+(aq) \rightarrow NH_4^+(aq)$

1.2 Exercise 6

1. n = 2	2. x = 10	3. 1.80 $moldm^{-3}$, 108 gdm^{-3}	4.73.9 %	5. 57.2 %
6. 66.3 %	7. x = 7			