# Revision Questions (Answers)

(1) d.

(2) b $n = \frac{m}{MM} = \frac{17}{M} = 1\text{ mole}$ $C = \frac{n}{V} = \frac{1}{1.2} = 0.832$

(3) No. 1st solution, conc = 1.0 M, 2nd solution is lower as adding solute to 1 litre of solvent would increase the volume to > 1 Litre, thus reducing conc. $(c = \frac{n}{V})$

(4) $2Al + 3H_2SO_4 \longrightarrow Al_2(SO_4)_3 + 3H_2$

12g

$\downarrow \frac{12}{27} = n$

$n_{Al} = 0.44$ $\xrightarrow{n_{H_2} = \frac{3}{1} \times n_{Al}}$ $n_{H_2} = 1.33$ (0.67)

error here, coeff in front of Al is 2, not one

$m = n \times MM = 0.67 \times 2g = 1.33g$

$= 2.67g$ (1.33 g)

(5) $Ca(OH)_2 + 2HCl \longrightarrow CaCl_2 + 2H_2O$

5g

$\downarrow n = \frac{5}{74.1}$

$n = 0.0675 \longrightarrow n_{HCl} = 2 \times n = 0.135$

$V = \frac{n}{C} = \frac{0.135}{0.1} = 1.35$ litres of 0.100 M HCl

(6) (b) First two zero are not sig as they are place setters.

(7) (a) 16

$PtCl_4 + 5XeF_2 \longrightarrow PtF_6 + 4ClF + 5Xe$

1 5 1 4 5

(8) (b) 12

$Cr_2(SO_4)_3 + 6RbOH \rightarrow 2Cr(OH)_3 + 3Rb_2SO_4$

(9) (d) 7

$2NH_3 + 3\frac{1}{2}O_2 \longrightarrow 2NO_2 + 3H_2O$

(10) (e) 3 moles of $H_2$ would produce 2 moles of $NH_3$, or 34g not 17.

(11) $8\,CH_3OH + 4\,MnO_4^- + 8H^+ \longrightarrow 8\,HCOOH + 4\,MnO_2$

NOTE equation is NOT balanced correctly, but has coefficients so assume error on examiners part. In exam use the equation as written (even though it is wrong)

$3\,CH_3OH + 4\,MnO_4^- \longrightarrow 3\,HCOOH + 4\,MnO_2$

12g

$n = \frac{12}{32}$

$n_{CH_3OH} = 0.375$

$n_{HCOOH} = \frac{3}{3} \times n \Rightarrow n_{HCOOH} = 0.375$

$m = n \times MM = 0.375 \times 46$

$= 17.25\,g$

(12) $O_2 + 2(CH_3)_2S \longrightarrow 2(CH_3)_2SO$

50g 75g

$n = \frac{50}{32}$ $n = \frac{75}{62}$

$n_{O_2} = 1.56$ $n_{(CH_3)_2S} = 1.21$

Limiting Reagent Comparison: $O_2$: $\frac{1.56}{1} : 1.56$ $(CH_3)_2S$: $\frac{1.21}{2} = 0.605$ ← LR

$(CH_3)_2S$ is limiting reagent

$n_{(CH_3)_2SO} = \frac{2}{2} \times n_{(CH_3)_2S} = 1 \times 1.21$

$= 1.21$

mass of $(CH_3)_2SO = n \times MM$

$= 1.21 \times 78g$

$= 94.4\,g$

(13) $C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2$

mass = 100.8g — $m = n \times MM$

51.5g — $n = \frac{51.5}{46}$

$n_{C_6H_{12}O_6} = 0.56$ — $n = \frac{1}{2} \times n_{C_2H_5OH}$ — $n_{C_2H_5OH} = 1.12$

(14) (d) limiting reagent limits the progress of the reaction by being used up first, or in other words "consumed completely"