

① Find the mol of oxygen present in 500 g

Ans.

$$\text{mol of } O_2 = \frac{\text{wt}}{\text{molar wt}} = \frac{500}{32} = 15.625 \text{ mol}$$

$$\begin{array}{r} 32 \overline{) 500} \quad 15.625 \\ \underline{480} \phantom{00} \\ 200 \phantom{00} \\ \underline{192} \phantom{00} \\ 80 \phantom{00} \\ \underline{64} \phantom{00} \\ 160 \phantom{00} \\ \underline{160} \phantom{00} \\ 0 \end{array}$$

② How many gram of Carbon are present in 264g  $CO_2$ ?

$$44 - 12$$

$$264 - 2$$

$$\begin{array}{r} 25.8 \\ 264 \times 12 \times 3 \\ \hline 44 \\ 22 \\ 11 \end{array}$$

$$\begin{array}{r} 12 \\ 32 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 25.8 \times 3 \\ \hline 4 \end{array}$$

$$12 + 32$$

$$44 \text{ g} - 12 \text{ g}$$

$$264 \text{ g} - 2$$

$$\begin{array}{r} 264 \times 12 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 24 \\ 74 \end{array}$$

$$3168$$

$$\begin{array}{r} 44 \times 72 \\ \hline 88 \end{array}$$

$$\begin{array}{r} 308 \phantom{00} \\ \hline 3168 \end{array}$$

③ Find the molecular weight of  $KMnO_4$

$$\begin{array}{r} K - 39 \\ Mn - 55 \\ O_4 - 64 \\ \hline 158 \end{array}$$

(2.4) A weight of 100g each of  $\text{HNO}_3$  and  $\text{H}_2\text{SO}_4$  is filled ~~with~~ in two separate bottles? which bottle contains more atoms? How many moles.

Molecular weight of  $\text{HNO}_3$

$$1 + 14 + 48 = 63$$

$$\text{mole of } \text{HNO}_3 = \frac{100}{63} = 1.58 \text{ moles}$$

Molecular weight of  $\text{H}_2\text{SO}_4$

$$2 + 32 + 64 = 98$$

$$\text{mole of } \text{H}_2\text{SO}_4 = \frac{100}{98} = 1.02 \text{ moles}$$

$$63 \overline{) 100} \quad (1.58)$$

$$\underline{63}$$

$$370$$

$$\underline{315}$$

$$550$$

$$\underline{504}$$

$$046$$

2

$$1.58$$

$$1.02$$

$$\underline{0.56}$$

$$98 \overline{) 100} \quad (1.02)$$

$$\underline{98}$$

$$2000$$

$$\underline{196}$$

$$00400$$

$$0.56 \times 6.022$$

$$112$$

$$112$$

$$336$$

$$\underline{337232}$$

$$3.37232 \times 10^{23} \text{ atoms more}$$

than the other bottle.

(2.5) How many kilograms of Carbon disulphide will contain 3.5 kmol carbon?

Molecular weight of  $\text{CS}_2$

$$\text{mole} = \frac{\text{wt.}}{\text{mol. wt.}}$$

$$12$$

$$64$$

$$\underline{76}$$

$$\text{kg mole} = \frac{\text{wt.}}{\text{mol. wt.}}$$

$\text{CS}_2$

$$76 \text{ kmol } \text{CS}_2$$

$$12 \text{ kmol Carbon}$$

$$12 \text{ kmol Carbon}$$

$$76 \text{ kmol } \text{CS}_2$$

$$3.5 \text{ kmol}$$

?

$$3.5 \times 76$$

$$\underline{12}$$

$$6.33 \times 3.5$$

$$3165$$

$$1899$$

$$\underline{22155}$$

$$12 \overline{) 76} \quad (6.33)$$

$$\underline{72}$$

$$040$$

$$\underline{36}$$

$$40$$

$$\underline{36}$$

$$22.15 \times 76$$

$$13290$$

$$15505$$

$$\underline{168340}$$

filled  
containers

1.58

2.15

Aqueous solution of triethanolamine (TEA), i.e.  $N(CH_2CH_2OH)_3$ , contains 50% TEA by weight. Find the molarity of the solution if the density of the solution is 1.05 kg/L.

Given: 100 kg TEA solution

100 kg solution contains 50 kg TEA

Molecular weight of  $N(CH_2CH_2OH)_3$

$$\begin{array}{rcl} N & - & 14 \\ C_6 & - & 72 \\ H_{15} & - & 15 \\ O & - & 16 \\ \hline & & 117 \end{array}$$

$$\text{molar TEA} = \frac{50}{117}$$

$$\text{molar TEA} = 0.42 \text{ kmol}$$

$$\text{Vol. of soln} = \frac{100}{1.05} \frac{\text{kg}}{\text{L}}$$

$$= 95.2 \text{ Lit.}$$

$$\begin{array}{r} 105) 10000 (95.2 \\ \underline{945} \\ 550 \\ \underline{525} \\ 250 \\ \underline{210} \\ 40 \end{array}$$

$$0.3356 \text{ kmol.}$$

$$95.2 \text{ Lit.} \quad \underline{\hspace{2cm}} \quad 0.3356 \text{ kmol.}$$

$$95.2 \text{ Lit.}$$

$$95.2 \text{ Lit.}$$