

① Find the molar mass of oxygen present in 500 g

Ans.

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

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

② How many grams of Carbon are present in 264g CO₂?

$$\begin{array}{r} 44 - 12 \\ 264 - 2 \end{array} \quad \begin{array}{r} 26.8 \\ 264 \times 12 \div 44 \\ \underline{44} \\ 22 \\ 11 \end{array} \quad \begin{array}{r} 12 \\ 32 \\ \underline{44} \\ 4 \end{array}$$

$$12 + 32$$

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

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

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

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

$$3168$$

$$\begin{array}{r} 44 \times 72 \\ \underline{} \end{array}$$

$$\begin{array}{r} 88 \\ 308 \\ \underline{} \end{array}$$

$$\underline{3168}$$

③ Find the molecular weight of KMnO₄

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

Q.4 A weight of 100g each of HNO_3 and H_2SO_4 is filled ~~with~~ in two separate bottles? which bottle contains more atoms? How many mole.

Molecular weight of HNO_3

$$1 + 14 + 48 = 63$$

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

Molecular weight of H_2SO_4

$$2 + 32 + 64 = 98$$

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

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

$$\underline{63}$$

$$370$$

$$\underline{315}$$

$$550$$

$$\underline{504}$$

$$046$$

540
27

2

$$\begin{array}{r} 1.58 \\ 1.02 \\ \hline 0.56 \end{array}$$

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

$$\underline{98}$$

$$2000$$

$$\underline{196}$$

$$00400$$

$$0.56 \times 6.022$$

$$\underline{112}$$

$$112$$

$$000$$

$$\underline{336}$$

$$3.37282 \times 10^{23} \text{ atoms more}$$

than the other bottle.

Q.5 How many kilograms of Carbon disulphide will contain 3.5 kmol carbon?

Molecular weight of CS_2

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

$$12$$

$$\underline{64}$$

$$76$$

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

CS_2

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

$$12 \text{ kmol Carbon}$$

$$12 \text{ kmol Carbon}$$

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

$$3.5 \text{ kmol}$$

?

$$\frac{3.5 \times 76}{12}$$

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

$$\underline{72}$$

$$040$$

$$\underline{36}$$

$$40$$

$$\underline{36}$$

$$6.33 \times 3.5$$

$$\underline{3165}$$

$$1899$$

$$\underline{22155}$$

$$\begin{array}{r} 22.15 \times 76 \\ \hline 13290 \\ 15505 \\ \hline 168340 \end{array}$$

Filed
 utzins
 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 $N(CH_2CH_2OH)_3$

N - 14
 C₆ - 72
 H₁₅ - 15
 O - 16

 117

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

molar TEA = 0.42 kmol

117 x 4

 468
 117 x 4

 468

117) 500 (0.42
 468

 320
 234

 860
 819

 41

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

= 95.2 Lit.

105) 10000 (95.2
 9450

 550

105) 10000 (95.2
 945

 550
 525

 250
 210

 40

95.2 Lit. ————— 0.3356 kmol.

95.2 Lit. ————— 0.3356 kmol.