MODEL SOLUTION

LEVEL-1

Q.1

Soln

(1) 16g of CH_4.

$= 1$ mole of CH_4.

$\equiv$ 4 mole of H.

(2). 31.2 g of C_6H_4.

$= \frac{31.2}{76}$ mol of C_6H_4.

eq. to 1.64 mole of H.

(3). 34.2 g of $C_{12}H_{22}O_{11}$.

$= \frac{34.2}{342}$ mole of $C_{12}H_{22}O_{11}$.

2.2 mole of H.

(4). $C_6H_{12}O_6$. (36g)

$= \frac{36}{180} \times 12$ moles of H.

$= 2.4$ mole of H. $\boxed{\text{Ans (1)}}$

Some Basic Concepts of Chemistry:
Mole-Concept.
Level - 01

Q. 1

Sol^n.

$$h = 6.627 \times 10^{-34}$$

$$E = h\nu$$

$$\Rightarrow h = \frac{E}{\nu} = \frac{ML^2T^{-2}}{\frac{1}{T}} = ML^2T^{-1}$$

1) a) Force $= MLT^{-2}$

2) b) Work = Energy $= ML^2T^{-2}$

3) c) Angular Momentum $= mvr$
$= MLT^{-1} \times L$
$= ML^2T^{-1}$

4) d) Torque $= F \times r$
$= MLT^{-2} \times L = ML^2T^{-2}$.

Ans (1)

Q.2

Sol^n It is a Gay Lussac's law of gaseous volume.

Ans (4)

Q. 3

Sol^n 3 Avogadro Hypotheses states that "Equal volume of gases under same conditions of temperature and pressure contains equal.

~~volume~~ ~~of~~ ~~gases~~ no. ~~of~~ molecules.

Ans (2)

Q. 4

Ans (3)

~~Q.5~~

~~Ans (3)~~

Q 6

Sol^n Molecular formula = M_4O_6

Let the ~~mole~~ atomic Mass of M be 'm'.

the molecular mass of Compound = $4m+96$

We have 96 gm oxygen in $4m+96$ grams of compound

=) we must have $\left(\frac{96 \times 18.88}{4m+96}\right)$ gm oxygen in 18.88 gms

of compound.

It is given that 18.88 grams ~~of~~ the compound contains 10g of M and 8.88 grams of 'O'.

So, $\frac{96}{4m+96} \times 18.88 = 8.88$ grams

(5).

$36\,ml$ of H_2O = $36g$ of H_2O ($\rho = 1\,gm/ml$)

$18g$ contains $1N_A$ H_2O molecules.

$36g$ contains $2N_A$ H_2O molecules.

$\because$ $1\,H_2O$ contains $10N_A$ protons $(8+2)$

$\therefore$ $2N_A\,H_2O$ contains $10 \times 2\,N_A$

$= 20N_A$

Ans (3).

$\Rightarrow m = 27g$

Ans (3).

Q7

Soln

$$HgCl_2 + KI \longrightarrow K_2HgI_4 + KCl$$

First balance the chemical reaction.

$$HgCl_2 + 4KI \longrightarrow K_2HgI_4 + 2KI$$

0.4.

Acc. to Balanced Chemical reaction.

4 Moles of KI gives 1 mole of K_2HgI_4.

so 0.4 moles of K_2HgI_4 is obtained from.

Ans (1).

Q8

Soln 8 Ammonium Nitrate : NH_4NO_3.

Molecular Mass = 80.

80g of NH_4NO_3 contains 28g of Nitrogen

1000 g of NH_4NO_3 contains $\left(\frac{28}{80} \times 1000\right)$ g of Nitrogen

= 350 g of Nitrogen

Ans (3)

Q-9
(9).

Soln 9.

1) 0.1 mol of $CaCO_3$.

M.wt $CaCO_3$ = 100g.

mass of 0.1 mol of $CaCO_3$ = 0.1 × 100
= 10g.

2). 1.51×10^{23} Ca^{2+} ions.

6.023×10^{23} Ca^{2+} ions have weight 40 gram.

1.51×10^{23} Ca^{2+} ions have weight $\frac{40}{6.023 \times 10^{23}} \times 1.51 \times 10^{23}$ g

= 10 grams.

3). 0.016 mole of CO_3^{2-}

M.W CO_3^{2-} = 60g.

.016 mole of CO_3^{2-} have mass = 0.016 × 60.
= 0.96 grams.

(4). 7.525×10^{23} atom

which atom?

So Ans (3).

(9)

No of Hydrogen atoms = 200.

0.05 g-atoms of Nitrogen = $6.023 \times 10^{23} \times .05$ atoms of N.

$= .30115 \times 10^{23}$

No of O-atoms = $6.023 \times 10^{23} \times 10^{-20}$.

$= 6.023 \times 10^{3}$.

$= 6023$

Total no of atoms = $200 + .30115 \times 10^{23} + 6023$.

$\simeq 3 \times 10^{22}$ atoms

Ans (3).

(10).

At wt of A = 75

At wt of B = 32.

$2A + 3B \longrightarrow 1X$.

According to law of conservation of mass.

wt of 1 mole of X = $2 \times 75 + 3 \times 32$
= 246 gms.

wt. of 5 mole of X = 246×5
= 1230 gm
= 1.23 Kg

Ans (3)

(11) 4 amu contains 1 He atom
52 amu contains $\frac{1}{4} \times 52 = 13$ atoms

Ans (3).

(12). ~~62g ion contain. 32 Na ions.~~
~~2g ion contain. $\frac{32}{62} \times 2$.~~

(12) 1gm ion contains 32 Na e^-
2gm ion contain 32×2 Na e^-
= 64 Na e^-

Ans (2).

Q13

1 gram ion = 1 mol ion.

1mol ion of Al^{3+} contain. $3N_A$ e coloumbs.

Ans (4).

(14) Let molecular weight of cortisone be x.

Acc to Question

$$21 \times 12 = \frac{69.98}{100} \times x$$

$$\Rightarrow x = \frac{21 \times 12 \times 100}{69.98}$$

$$= 360.1$$

Ans (4)

15) Ans (3).

16).

$$\frac{55.9}{100} \times (142 + 18x) = 18x$$

$$79.378 + 10.06x = 18x$$

$$7.938x = 79.378$$

$$\Rightarrow x = \frac{79.378}{7.938} \approx 10$$ Ans (4)

17

	X	Y
%	50	50.

Mole Ratio $\frac{50}{10} = 5$ $\frac{50}{20} = 2.5$.

Simplest mole ratio. $\frac{5}{2.5} = 2$ $\frac{2.5}{2.5}$ 1.

$X_2 Y_1$.

Ans (2).

18

$\frac{10 \times 18}{322} \times 100 = x$

$\Rightarrow x = 56\%$.

Ans (3).

19.

	I	O
%.	76%.	24%.
mole ratio	$\frac{76}{127}$	$\frac{24}{16}$.

$\therefore$ Mole Ratio $\quad .598 \quad 1.5$

Simple mole ratio $\quad \frac{.598}{.598} = 1 \quad \frac{1.5}{.598} = 2.5$

$I_1 O_{2.5}$ Empirical formulae.

I_2O_5 " .

Ans (3).

20)
Soln

Let x be molecular mass of compound.

$$2 \times 14 = \frac{.014}{100} \times x.$$

$$\Rightarrow x = \frac{100 \times 2 \times 14}{.014}$$

$$= 20,0000$$

Ans (4).

21)

Soln	N_2	O_2.
%	80	20
~~mole ratio~~	~~$\frac{80}{28} = 2.85$~~	~~$\frac{20}{32} = .625$~~
simple ~~mole ratio~~	$\frac{2.85}{.625}$	

$$\text{Mol wt of Air} = \frac{80 \times 28 + 20 \times 32}{100}$$

$$= 28.8$$

Mol wt $= 2 \times$ V.D

$$VD = \frac{\text{Mol wt}}{2} = \frac{28.8}{2} = 14.4.$$

Ans (2).

22). $CaCl_2$ (x) gm + $Na_2CO_3 \rightarrow CaCO_3$.
+
NaCl
$(10-x)$ gm.

111 gm $CaCl_2$ gives 100 gm. (1 mole $CaCO_3$)

x gm. $CaCl_2$ gives $\frac{100}{111} x$ gm of $CaCO_3$.

$$CaCO_3 \xrightarrow{\Delta} CaO$$

100 g   56 gm.

$\frac{100x}{111}$ g $\longrightarrow$?

$\frac{56}{100} \times \frac{100x}{111}$ gm of CaO is formed.

$$\frac{56x}{111} = 1.62$$

$x = 3.21$ gm of CaO is formed.

% composition of $\frac{3.21}{100} \times 100 = 32.1\%$.

Ans (2)

23). $2A \longrightarrow 2B$, $B \rightarrow 2C$, $3C \rightarrow 4D$.

$2A \rightarrow 2B$.

$4 \rightarrow 4$ moles B.

$B \rightarrow 2C$.

$4 \rightarrow 8C$.

$3C \rightarrow 4D$.

$3 \rightarrow 4$.

$8 \rightarrow \frac{4}{3} \times 8 = \frac{32}{3} = 10.67$

Ans (4)

24) $H_2SO_4 + Ca(OH)_2 \rightarrow CaSO_4 + 2H_2O$.

At t=0 .5 0.2 ?

.3 0 .2

Ans (1).

25 (1) 1500 cc solution contains 18g Urea.

1.052×1500 gms solution contains 18g Urea.

1578 gm solution contain 18g Urea.

$(1578 - 18)$ gm solute contains $\frac{18}{60}$ ~~gm~~ mole Urea

1560 gm solute contain .3 mole Urea.

1000 gm solute contain $\frac{.3}{1560} \times 1000 = .192$ mole

Ans (2).

26. 3 molal means.

3 mole of NaOH is present in 1000 gm of ~~solution~~ solute.

$\Rightarrow$ 3 mole of NaOH is present in 1120 gm of solution

$\Rightarrow$ " " " " " $\frac{1120}{1.11} = 1009$ ml of soln

1009 ml soln $\rightarrow$ 3 mole NaOH.

1000 ml soln $\rightarrow \frac{3}{1009} \times 1000 = 2.97$ mol of NaOH.

By Defination of molarity

Molarity of solution is 2.97 M.

27).

$2Al + \frac{3}{2}O_2 \longrightarrow Al_2O_3$.

$\frac{3}{2}$ mole $O_2 \rightarrow$ 1 mole Al_2O_3.

$\frac{1}{2}$ mole $O_2 \rightarrow \frac{1}{3} \times \cancel{2} \times \frac{1}{\cancel{2}}$

$= \frac{1}{3}$ mol Al_2O_3.

&.

$\frac{3}{2}$ mole O_2 requires 2×27.

$\frac{1}{2}$ mole O_2 requires $\frac{2 \times \cancel{27}\,9}{\cancel{3}} \times \cancel{2} \times \frac{1}{\cancel{2}}$

$= 18$ gm.

Ans (4).

28) (1) $\frac{22.4}{} \times .2 = 4.48L$

(2). $22.4 \times \frac{12.8}{64} = 4.48L$.

(3). $22.4 \times \frac{3.2}{32} = 2.24L$ Ans (3).

29

	N	O
%	26	74
mole ratio	$\frac{26}{14} = 1.857$	$\frac{74}{16} = 4.625$
simple mole ratio	$\frac{1.857}{1.857} = 1$	$\frac{4.625}{1.857} = 2.5$

$NO_{2.5}$

N_2O_5

Ans (4).

30).

~~1mole~~

12 mole H present in 1mole $(NH_4)_3PO_4$.

3.18 mole H present in $\frac{1}{12} \times 3.18$ $(NH_4)_3PO_4$.

$= .265$ $(NH_4)_3PO_4$.

1 mole $(NH_4)_3PO_4$ contains 4 mole O atom

.265 mole $(NH_4)_3PO_4$ contains $\frac{4}{1} \times .265$

$= 1.06$

Ans (3)

Level. II

1). $2KClO_3 \rightarrow 2KCl + 3O_2$.

3×22.4 O_2 (L) is obtained from 2 mole $KClO_3$.

11.2 l is obtained from $\frac{2}{3 \times \cancel{22.4}} \times \cancel{11.2}$.

$= \frac{1}{3}$ mol.

Ans (2).

2). $A + 2B \rightarrow C$.

5   8

B is limiting Reagents

$2B \rightarrow 1C$.

$8B \rightarrow \frac{1}{2} \times 8 = 4$ moles C.

Ans (2).

3). $Fe_2(SO_4)_3 + 3BaCl_2 \rightarrow 3BaSO_4 + 2FeCl_3$.

$2FeCl_3$ obtained from. 3 mole $BaCl_2$.

$\frac{1}{2} FeCl_3$ " " $\frac{3}{2} \times \frac{1}{2} = \frac{3}{4}$ mol $BaCl_2$.

Ans (3).

4) $\left(10+\frac{x}{4}\right)$.

$C_{10}H_x + O_2 \longrightarrow 10CO_2 + \frac{x}{2}H_2O$.

1 mole $C_{10}H_x$ requires $10+\frac{x}{4}$ mol of O_2.

2.5 mole " " $\left(10+\frac{x}{4}\right) \times 2.5$ mole of O_2

$25 + \frac{2.5}{4}x = 32.5$

$\frac{2.5}{4}x = \cancel{7.5}\ 3$

$x = 12$.

Ans (3)

(5)

$AgNO_3 + HCl \rightarrow AgCl + HNO_3$.

2.125g

moles of AgCl formed $= \frac{2.125}{143.5} = .0148$ moles.

$= 14.8$ millimoles

Moles of $AgNO_3$ required $= 14.8$ millimoles

$MV = 14.8$

$M \times 25 = 14.8$

$M = \frac{14.8}{25} = .6$.

Ans (2).

6

3.60×98 gm H_2SO_4 present in 1000 ml. solution (11)

352.8 " " " " " " ".

&

29 gm H_2SO_4. present in 100 gm solution

352.8 gm H_2SO_4 present in $\frac{100}{29} \times 352.8$ gm solution

1216.55 gm.

$$\text{density of soln} = \frac{1216.55}{1000} = 1.216 \text{ gm/ml.}$$

Ans (1).

7).

$$\frac{x}{60+x} \times \cancel{100}^{5} = \cancel{20}.$$

$\Rightarrow 5x = 60 + x.$

$\Rightarrow 4x = 60$

$\Rightarrow x = 15.$

Ans(1).

8) 2.7g of Ag_2CO_3.

$$2Ag_2CO_3 \rightarrow 4Ag + 2CO_2 + O_2.$$

Ans (1).

2 mole $\rightarrow$ 4 Ag

$\frac{2.7}{276} \rightarrow \frac{4}{2} \times \frac{2.7}{276.} = .019$ mole Ag

$= 0.019 \times 108 = 2.11$ gm

(9). $2KClO_3 \rightarrow 2KCl + 3O_2$.

2 mol — 3 mole.

1 mol — ?

$\frac{3}{2}$ mol of O_2 is obtained from 1 mole $KClO_3$.

$2Al + \frac{3}{2}O_2 \rightarrow Al_2O_3$.

$\frac{3}{2}$ O_2 gives 1 mole Al_2O_3.

so Ans (1).

10

	N_2	$+ 3H_2$	$\rightarrow 2NH_3$
Before reac^n.	10	15	0
After reaction	10−5	15−15	10
	5 mol	0 mol.	

Ans (1).

11) Ans (4)

12. Molarity of $sol^n = \frac{2.65}{106} \times \frac{1000}{250}$

$= \cancel{.101\ mol}\ .125$

$M_1V_1 = M_2V_2$

$.125 \times 10 = M_2 \times 1000$

$M_2 = \frac{.125 \times 10}{1000}$

Ans $= .00125$

Ans (2).

13) 1.595 gm of $CuSO_4$ ~~contain~~ present in 100gm of sol^n.

1.2 gm solution $\equiv$ 1 ml of solution

100gm solution $\equiv \frac{1}{1.2} \times 100$

$= 83.33$ ml solution.

So. $\frac{1.595}{159.5} = .01$ mole of $CuSO_4$ present in 83.33 ml sol^n.

83.33 ml solution contains .01 mol of $CuSO_4$.

1000 ml solution contain $\frac{.01}{83.33} \times 1000$ mol of $CuSO_4$

$= .12$ mol of $CuSO_4$.

Ans (1).

14).

~~$N_1V_1 = N_2V_2$~~.

Milliequivalents of Dibasic acid.

$= 100 \times \frac{1}{10} = 10$.

equivalents $= 10 \times 10^{-3}$.

So.

$\frac{.59}{E} = \frac{10}{1000}$.

$E = 59$.

$E = \text{Basicity} \times \frac{1}{\text{Mol. wt}}$

Mol wt $= \frac{59 \times 2}{\cancel{2}} = \cancel{29.5}$ Ans (2).

118

17.

$$C_6H_{12}O \xrightarrow[H_2SO_4]{\Delta} C_6H_{10}.$$

100 g $\longrightarrow$ 82 gm C_6H_{10}.

Since yeild is 75%

So.

$$\frac{75}{100} \times 82 = 61.5 \text{ gm}$$

Ans (1)

18.

$$Ag_2S \xrightarrow{\Delta} 2Ag.$$

$(2\times108+32)$g $\quad$ (2×108)g

? $\quad$ 1g

So, we need 1.148 gm of Ag_2S; so

this is 1.34% of ore.

$$\frac{1.34}{100} \times x = 1.148$$

$$\Rightarrow x = 85.67. \quad \text{Ans (2)}$$

15

$$CaCO_3 \xrightarrow{\Delta} CaO + CO_2.$$

? 56 Kg.

56 gm of CaO is obtained from 100 gm $CaCO_3$.

56 Kg of CaO is obtained from 100 Kg $CaCO_3$.

Ans (4).

16

Mass of magnesium present

$= \frac{2.68}{100} \times 3$

$= .0804$ gm.

moles of magnesium present $= \frac{.0804}{24}$.

No of magnesium atom $= \frac{.0804}{24} \times 6.023 \times 10^{23}$

$= .0201 \times 10^{23}$.

Ans(1). $= 2.01 \times 10^{21}$

21) x moles $FeSO_4$ gives. x moles of SO_4 ions

y moles of $Fe_2(SO_4)_3$ $3y$ moles of SO_4 ions.

$$x = 3y.$$

$$\frac{x}{y} = 3.$$

x moles $FeSO_4$ give x moles Fe^{2+}.

y moles $Fe_2(SO_4)_3$ gives $2y$ Fe^{3+}

$$\text{Ans} = \frac{x}{2y} = \frac{3}{2}.$$

Ans (4)

22)

1 atom weighs 3.98×10^{-23} g.

6.023×10^{23} atom weighs $\frac{3.98 \times 10^{-23}}{1} \times 6.02 \times 10^{23}$

$$= 24$$

Ans (3).

19

$2Al + 2NaOH + 2H_2O$

$\longrightarrow 2NaAlO_2 + 3H_2$.

54g $\longrightarrow$ 3×22.4 l of H_2.

Al

27g $\longrightarrow$ $\frac{3 \times 22.4}{54} \times 27 = 33.6$ l

Ans (4).

20). $I_2 + 2Cl_2 \longrightarrow 1ICl + 1ICl_3$.

254g	2×71g.	162·5	232·9.
		?	?
·1	·2	·1 mole	·1. mol.
		·1×162 gms	·1×232·9 gms.
		16·2 gms.	23·29 gms.

Ans (1)

23

210 g of polonium. contains 6.02×10^{23} atoms.

1×10^{-3} g of " " $\frac{6.02\times10^{23}}{210}\times1\times10^{-3}$

$= .02867\times10^{23}$ atoms.

$\frac{1}{200}$th parts converts to lead. to lead 1 day.

$\frac{1}{200}\times .02867\times10^{20}$ convert to lead 1 day.

$\Rightarrow$ ~~$.02867\times10^{18}$~~

$\Rightarrow$ 1.5×10^{16} atom converts to lead atom in 1 day.

24)

$C_4H_{10} + \frac{13}{2}O_2 \rightarrow 4CO_2 + 5H_2O$

1Kg ?

58g requires $\frac{13}{2}\times32$ g of oxygen.

1000g " $\frac{13}{2}\times\frac{32}{58}\times1000$ g of oxygen.

$= 3580$ g of O_2

Ans (4).

25) 1g-atom ≡ 1 mole atom.

Ans (2).

26)

Let the formulae be M_2O_x.

$Mol.wt = 128 + 16x$.

So.

$$\frac{3.2}{3.6} = \frac{128}{128+16x}.$$

$\Rightarrow x = 1.$

So. simplest formulae.

M_2O.

Ans (2).

27)

$$\frac{Fe}{C} \quad \frac{\cancel{3}\times\cancel{56}\ \cancel{28}\ 7}{\cancel{6}_2\ \cancel{\times 12}\cdot 3} = 7:3.$$

Ans (3)

28) $M_1V_1 + M_2V_2 = M_3 (V_1 + V_2)$.

$.36V_1 + .15V_2 = .24(V_1 + V_2)$

$.36\frac{V_1}{V_2} + .15 = .24\left(\frac{V_1}{V_2} + 1\right)$

$\Rightarrow V_1/V_2 = 3/4$ Ans (4)

29) 2 mol.

$$SO_2 + 2H_2S \longrightarrow 3S + 2H_2O$$

11.2 L at NTP — 2 mol. — x.

$\frac{1}{2}$ mol.

1 mol $SO_2 \rightarrow$ 3 mole S.

$\frac{1}{2}$ mol $SO_2 \rightarrow \frac{3}{1} \times \frac{1}{2} = 1.5$ mole S.

Ans (1)

30). 152 g of camphor contain $6.02 \times 10^{23} \times 27$ atoms

25×10^{-3} g " " " $\frac{6.02 \times 10^{23} \times 27}{152} \times 25 \times 10^{-3}$

$= 2.67 \times 10^{21}$

Ans (4)

Q46 Ans 6 - (1)

Q7 Ans (1)

Q8 Ans (1)

Q9 Ans (1).

Q10 Ans (1).

Q1

Soln

Ans(3).

Q2

Soln (1)

Q3

Soln (1).

Q4

Soln (4)

Q5 millimoles of $Ba(OH)_2 = 31.26 \times .165$

$= 5.1579$

millimols of citric acid $= 25 \times .138$

$= 3.45$

for Neutralization

$N_1V_1 = N_2V_2$.

$5.1579 \times 2 = 3.45 \times 3$.

$10.35 = 10.35$

Ans (1).

PREVIOUS YEARS QUESTIONS

1) Moles of HNO_3 sequised $= \frac{250 \times 2}{1000}$

$= 0.5$ moles of HNO_3

70% of $x = .5$

$\frac{70}{100} x = .5$

$x = .71$ moles of con. HNO_3

$= .71 \times 63$

$\simeq 45 g$ of conc. HNO_3

Ans(2)

2) Dichlorotetraaquachromic (III) chloride

Ans (1).

$[Cr(H_2O)_4 Cl_2] Cl$ one ionizable Cl^-

3). 100 ml solution contain $\frac{\cancel{6.02} \times 10^{20}}{\cancel{6.02} \times 10^{23}}$ mols

1000 ml " " $\frac{10^{-3}}{100} \times 1000$

$= \frac{1}{100}$ mols

$= .01 M$ Ans(3)

Q1
Sol1

The law states that "when two elements combines separately with third element and form different types of molecules, their combining ratio is directly reciprocated if they combine directly.

P_2O_3, PH_3, H_2O.

P_2O_3
62 g of P combines with 48 g of O.
31 g of P combines with 24 g of O.

PH_3
31 g of P combines with 3 g of H.

So, when O combines with H, they should combine in the ratio 24:3 (ie 8:1) or in simple multiple of it. The same is found to be true in H_2O molecules. The ratio of weight of H and O in H_2O is 1:8.

So Ans (1).

Q.4.
Sol.4.

$N_2 + 3H_2 \rightarrow 2NH_3$.

20 Kg 3 Kg.

Acc to stiocheometry.
N_2 is in excess and Hydrogen (H_2) is a limiting reagant
so 6 Kg H_2 gives 34 kg of NH_3

so 3 Kg of H_2 gives 17 Kg of NH_3.

Ans.(1).

Q5
Sol.5

$$Na_2HPO_4 + NaH_2PO_4 \rightarrow Na_5P_3O_{10}$$

So Ans(3)

Q6
Soln.

$$E = mc^2 \Rightarrow E = 1.66\times10^{-27} \times 3\times10^{8}$$
$$= 1.492\times10^{-10}\,J.$$

Ans(1)

Q.7
soln.

$$Na_2\overset{+2}{S_2}O_3 + I_2 \rightarrow Na_2\overset{2.5}{S_4}O_6 + I^{-1}.$$

TCION = 1.

$$Eq.\ wt = \frac{At\ wt}{TCION} = \frac{Molar\ Mass}{1} = Molar\ Mass.$$

Ans(1).

Q.8
Soln

Acc to Q. and let At. mass of M be m.

$$2M + \frac{x}{2}O_2 \rightarrow M_2O_x.$$

$2m$ mass $\rightarrow$ $2m+16x$ mass.

$$16x = \frac{24}{100}\times 2m \Rightarrow \frac{m}{x} = \frac{16\times100}{24\times3}$$
$$= 33.3.$$

Ans.(3).

Q9.

	C	H	O
	24g	4g	32
mole ratio	2	4	2

$= 1:2:1$ Ans(2).

10 (37) Let the amount of $CaCl_2$ be x. 20 (2)

Sol:

$CaCl_2 + Na_2CO_3 \longrightarrow CaCO_3 + 2NaCl$.

110g 100g.

So 110g of $CaCl_2$ gives 100g of $CaCO_3$

x g of $CaCl_2$ gives $\frac{100}{110} x$ g of $CaCO_3$.

$CaCO_3 \longrightarrow CaO + CO_2$.

$\frac{100}{110} x \longrightarrow ?$

$100 \longrightarrow 56g$.

100 gm of $CaCO_3$ gives 56g of CaO.

$\frac{100x}{110}$ gm of $CaCO_3$ gives $\frac{56}{\cancel{100}} \times \frac{\cancel{100}x}{110}$ g of CaO.

$= \frac{56}{1100} x$ g of CaO.

Acc to Question

$\frac{56}{100} x = .56$.

$x = \frac{.56 \times \cancel{100} 110}{56} = 1.1$ gm of ~~CaO~~

So amount of $CaCl_2$ present in mixture is 1.1gm

$4.44 gm - 1.1 gm$

$= 3.34$ gm of NaCl.

% composition of NaCl in a mixture is

$$\frac{3.34}{4.44} \times 100 = 75\%$$

Ans (1).

Q11

Sol

22.4 l of Oxygen at STP contains 32g oxygen.

1 l of oxygen at STP contains $\frac{32}{22.4}$ g oxygen

$= 1.43$ g oxygen.

Ans (1).

Q12. 22.4 l of H_2 at STP contains 1 mole.

.224 l of H_2 at STP contains $\frac{1}{22.4} \times .224$ l mole.

$= .01$

Ans (2)

Q12

Soln 12

18 g of water contain 6.023×10^{23} molecules.

1 molecules of water has $\frac{18}{6.023 \times 10^{23}}$ gm.

$\because$ density of $H_2O = 1 \text{ gm}/\text{cm}^3$.

1 gm of water has volume 1 cm^3.

$\frac{18}{6.023 \times 10^{23}}$ gm of H_2O has $\frac{18}{6.023 \times 10^{23}}$ cm^3.

$= 3 \times 10^{-23} \text{ cm}^3$

Ans (4)

Q13

Soln

1 mole of triatomic gas $3 \times 6.02 \times 10^{23}$ atoms

$\therefore$ 1 mole of triatomic gas contain

$\frac{3 \times 6.02 \times 10^{23}}{1}$ atoms

1.806×10^{23} atoms.

Ans (2).

Q14

Soln

17 g NH_3 contains $4 \times 6.023 \times 10^{23}$ atoms.

4.25 g NH_3 contains $\frac{4 \times 6.023 \times 10^{23}}{17} \times 4.25 = 6.023 \times 10^{23}$ atoms.

Ans (1)

Q 15.

soln:

$2.8g$ of M is present in $4g$ of M_2O_x.

$2\times56\,g$ of M is present in $\frac{40}{2.8}\times2\times56$ of M_2O_x

$= 160\,g$ of M_2O_x.

So, this would be molecular weight

$160\,g$ of M_2O_x contains $2\times56 = 112\,g$ of M.

and $48\,g$ of O.

$\Rightarrow$ There are 3 oxygen atoms.

Q 16-

soln

No of milli equivalents $\cancel{10} = NV$ (ml).

$= .02\times100$

$= 2$

No of equivalent $= 2\times10^{-3}$.

No of moles. $= \frac{1}{\cancel{2}}\times\cancel{2}\times10^{-3} = 10^{-3}$.

1 mole contains 6.023×10^{23} molecules.

10^{-3} mole contains $6.02\times10^{23}\times10^{-3}$

$= 6.023\times10^{20}$ molecules.

Q1 17 (22)

Soln:

$NH_2OH \longrightarrow N_2O$

ox. No of N = -1 ox. No of N = +1

J-factor = change in oxidation state

= 2.

equivalent weight $= \frac{\text{Mol. wt}}{\text{J-factor}}$

$= \frac{M}{2}$.

Ans (2).

Q1: 18

Soln:

Mass of 1 e^- = 9.1×10^{-28} g.

∴ Mass of 1 mol (6.023×10^{23}) e^- =

$9.1 \times 10^{-28} \times 6.023 \times 10^{23}$.

= .55 mg.

Ans (2).

Q 19

Soln:

No of milli equivalents of HCl

= NV (ml)

= 1 × 100 = 100 meq.

No of equivalent $= \frac{100}{1000} = .1$ eq.

~~Eq wt of M = No. of eq. × weigh=~~

·1 eq contains ·9 g of metal.
1 eq contain 9 g of metal.
This would be the equivalent weight of M.

Q 120
Sol^n !?

The metal can be M^+ or M^{2+}
Assume metal is M^{2+}.
the chloride is in the form. MCl_2
Molar Mass of Cl $= 35.5$
Mass of $Cl_2 = 71$.
Mass of Chloride $= 74.5$
Mass of metal $= 74.5 - 71 = 3.5$.
We know no metal exist than has an mass 3.5 g.
So M^{2+} cannot be possible.
Let the metal be M^+, then the mass of metal =
$74.5 - 35.5 = 39$.
and chloride would be MCl.
Equivalent weight be Metal would be 39.
Ans (3)

Q 21
Soln.

22400 ml contains 6.023×10^{23} molecules.
1.12×10^{-7} ml contains $\frac{6023 \times 10^{23}}{22400} \times 1.12 \times 10^{-7}$.
$= 3.01 \times 10^{12}$ Ans (1).

~~22~~ 25

Soln ~~22~~ 25

(23)

$2N\ H_2SO_4$ has volume $0.1\ dm^3$

$$= \frac{.1}{1000} m^3$$

$$N_1V_1 = N_2V_2$$

$$2 \times .1 = \frac{1}{10} V_2$$

$$\Rightarrow V_2 = 2$$

Ans (3)

Q. ~~23~~

Soln. 23

$18g \rightarrow 6.023 \times 10^{23}$ molecules

N_A molecules

$18 \times 10^{-3} \rightarrow N \times 10^{-3}$ molecules

Ans (1)

Q. ~~26~~ 26

Soln ~~26~~ 26.

Assuming it contain 1N atom.

20% of Molecular Mass = 14 (Molar mass of N).

$$\frac{20}{100} x = 14.$$

$$x = \frac{\cancel{1400}\ 70}{\cancel{20}}$$

Ans (1) 70.

Q 22

Soln

Equivalent Mass = 32 g.

Molar Mass of Metal = 64 g.

Since it is a bivalent the metal nitrate would be $M(NO_3)_2$

So Molecular mass = $64 \times 2 (48+14)$.

= 188 g.

Ans (3).

Q. 23

Soln

Ans (5).

Q 24

Soln

1.5 g of $CdCl_2$ contain .9 g Cd and .6 g Cl

.6 g Cl is present 1.5 g of $CdCl_2$.

70 g Cl is present in $\frac{1.5}{.6} \times 70 = 175$ g of $CdCl_2$.

Molecular Mass of $CdCl_2$ = 175 g.

Atomic Mass of Cd = 175 − 70

= 105 g.

Ans (3)

For equivalent to be half of molecular mass.

its oxidation must be ie +4 or 0.

In (2) oxidation state of Mn is +4.

So Ans (2).

Q. 30

Soln. 30

Balancing Redox reaction

$Cr_2O_7^{2-} + 14H^+ + 6e^- = 2Cr^{3+} + 7H_2O$

$Fe^{2+} \rightarrow Fe^{3+} + e^-$

$Cr_2O_7^{2-} \rightarrow 2Cr^{3+}$ $+14H^+ \quad\quad +7H_2O$ $+6e^-$	$6Fe^{2+} \rightarrow 6Fe^{3+} + 6e^-$

So Balanced Redox Reaction.

$Cr_2O_7^{2-} + 6Fe^{2+} + 14H^+ \rightarrow 2Cr^{3+} + 6Fe^{3+}$

1 6

For 6 mole of Ferrous oxalate 1 mole of potassium dichromate is required.

for 1 mole of ferrous oxalate $\frac{1}{6}$ mole of potassium dichromate

Q.

Soln 27

$$2H_2 + O_2 \longrightarrow 2H_2O$$

4g 32g 36g

10g 64g ?

O_2 : Limiting Reagant

H_2 : Excess.

32g O_2 $\rightarrow$ 2moles of H_2O

64g O_2 $\rightarrow$ $\frac{2}{3\cancel{2}} \times \cancel{64}\,2$ = 4moles of O_2.

Ans (2).

Q. 28

Soln 28

$$C + O_2 \longrightarrow CO_2$$

12g 32g 22.4L (at NTP).

Ans (2).

Q. 29.

Sol

In $MnSO_4$.

ox. state of Mn = +2.

Ans (~~1.25~~) ·25.

Ans (3)

Q. 31

Soln:

$$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$$

50ml × 0.5M — 25 milli moles.

25 millimoles.

So, we get 25 millimoles of $CaCO_3$. Now.

$$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2CO_3$$

25 millimoles.

So 25 millimoles required 50 millimoles of HCl for nuetralization.

$$M_{HCl} V_{HCl} = 50$$

$$.1 \times V_{HCl} = 50$$

$$V_{HCl} = \frac{50}{.1} = 500ml$$

Ans (2).

Q-32

Soln =

27 g contains 6.023×10^{23} Al atoms.

4.5×10^{-5} g contains $\frac{6.023 \times 10^{23}}{\cancel{27}\ 6} \times \cancel{4.5} \times 10^{-5}$ Al atoms.

$Al^{3+} + 3e \rightarrow Al$

So $3e^-$ required per Al atom.

Required number of $e^- = \frac{3 \times 6.023}{6} \times 10^{18}$

$= 3.01 \times 10^{18}\ e^-$.

Ans (2).

Q33

Soln :-

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

16 g $\quad 2 \times 22.4L$ (at STP).

$\because$ 16g of Methane require $2 \times 22.4L$ of O_2.

$\therefore$ 4g of Methane require $\frac{\overset{11.2}{\cancel{2 \times 22.4L}}}{\cancel{16}\ 4\ 2} \times \cancel{4} = 11.2L$ of O_2

Ans (1).

Q: 34

Soln

1 atom weighs $- 1.8 \times 10^{-22}$.

6.023×10^{23} atom weighs $\rightarrow 1.8 \times 10^{-22} \times 6.022 \times 10^{23}$.

$= 108.36$

Ans (3)

Q. 35

Soln.

Ans.

$$KMnO_4 \xrightarrow{\text{Alkaline}} \overset{+4}{Mn}O_2.$$

TCIOS. = 3.

(total change in oxi. state).

$$Eq. wt = \frac{M}{TCIOS} = \frac{M}{3}$$

Ans (2)

Q. 36

Soln

$$PH_3 \xrightarrow{\Delta} P + \frac{3}{2}H_2 \uparrow.$$

100 ml $\cancel{100}$ (solid). $\frac{3}{2} \times \cancel{100}\,50 = 150$ ml

So Ans (1) and ↑ of 50 ml of total volume

Q 37

Soln :-

$2C + O_2 \rightarrow 2CO$.

$2Fe_2O_3 + 6CO \rightarrow 4Fe + 6CO_2$.

320g. 168g.

1600g ?

Amount of CO required to reduce 1.6 Kg of Fe_2O_3 is $\frac{168}{320} \times 1600 = 840\,g$.

$2C + O_2 \rightarrow 2CO$.

32g 2×28 g

? 840g

2×28g CO is obtained when 32g O is used

840g CO is obtained when $\left(\frac{32}{2\times 28} \times 840\right)$ O is used.

$= 480\,g$

Ans (2).

Q. 38

Soln:

Ans (2).

Q. 39

Soln:

1 mole methane = 16 gm.

·1 mole methane = 1.6 g.

Ans (3)

Q. 40

Soln: The compound M_xO_y has $y \times 16$ parts of oxygen. combining with x atomic mass of M.

Therefore 8 parts of oxygen combines with.

$$M = \frac{Mx}{16y} \times 8$$

$$E = \frac{x \times \text{atomic mass of } M}{2y}$$

$$M = \frac{2Ey}{x}$$

Ans (1)

41 (52)

Soln

(1) Ans (1).

42

soln. Ans (1).

43

Soln. One eq. of the metal reacts with one mole of OH^{-1} ie it reacts with 17g of OH^{-1}. Similarily, one equivalent of the metal reacts with $\frac{1}{2}$ mole oxygen atom ie 8 g oxygen atoms.

Let E be eq. mass of the metal and x be the no. of equivalents of Metal hydroxide ignited

$$x(E+17) = 1.520\,g$$

$$x(E+8) = .995$$

$$\Rightarrow E = 9\,g$$

Ans (4).

44

Soln

First oxide.

78% 22%
Fe O.

Suppose 78g 22g

106g. 30g.

Second oxide.

70% 30%
Fe O.

70g 30g.

$$\frac{Fe\ (first\ oxide)}{Fe\ (second\ oxide)} = \frac{\cancel{106}\ \cancel{15}\ 3}{\cancel{70}\ \cancel{10}\ 2}.$$

Ans(1).

45

Soln

$$3MnO_4^- + 24H^+ + 5FeC_2O_4 \rightarrow 3Mn^{2+} + 12H_2O + 10CO_2 + 5Fe$$

for 5 mol FeC_2O_4 3 mole of MnO_4^- is required

for 1 mol FeC_2O_4 $\frac{3}{5} \times 1 = .6$ mole of MnO_4^- is required

Ans .6.

Ans (1)

Q.46 54

Soln.

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

1L 5L

Ans (3)

47

Soln :-

$PbO + 2HCl \longrightarrow PbCl_2 + H_2O$.

	PbO	2HCl	$PbCl_2$
Acc. to stio.	223g.	72g.	277g.
Given	6.5	3.2.	

L.R = PbO.

223g PbO gives 277g $PbCl_2$.

6.5g PbO gives $\frac{277}{223} \times 6.5$ g $PbCl_2$

$= 8.073$ g $PbCl_2$

$\Rightarrow .029$ mol of $PbCl_2$.

Ans (4)

48

Soln :

Fe^{2+} is present in Mohr's salt is oxidised to Fe^{3+}. So change in Oxidation no. is 1

Equivalent mass $= \frac{M}{TC10S} = \frac{392}{1} = 392$

49

Soln

$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$.

Ans (3).

50

Soln

$C + O_2 \rightarrow CO_2$

$\frac{10}{100}$ % of 40 carbon remains unreacted.

$\frac{10}{100} \times 40 = 4g$ carbon unreacted

so only 36 g of C reacted.

$C + O_2 \rightarrow CO_2$.

36 ?

$12g \rightarrow 22.4l$

$36g \rightarrow 22.4 \times 3 \cdot L$.

$= 66.2 L$

Ans (2)

51

Soln

$K_2S_2O_8 + 2KI \rightarrow 2K_2SO_4 + I_2$.

Ans (3)

52

Soln 52

$MnO_4^- \rightarrow Mn^{2+}$ | $5Fe^{2+} \rightarrow 5Fe^{3+} + e^-$

$8H^+$ $+ 4H_2O$

$+ 5e$

so $5e^-$ gets transfer.

Ans (2)

Q 53

Soln

(i) 34g of H_2O

$\frac{34}{18}$ N_A molecules.

(ii) $\frac{28}{44}$ N_A molecules.

(iii) $\frac{46}{32}$ N_A molecules

(iv) $\frac{54}{118}$ N_A moles.

Ans (1).

Q.55
Soln

$$5Fe^{2+} \rightarrow 5Fe^{3+} + 5e^- , \quad MnO_4^- + 5e \rightarrow Mn^{2+}.$$

Ans. (2)

56
Soln

J. factor $KMnO_4 = 5$

No of millimoles of $KMnO_4$ present $= M V (ml)$
$= 250 \times .04$
$= 10.$

No of moles of $KMnO_4$ present $= \frac{10}{1000}$.

No of equivalent is $=$ j-factor $\times$ Moles
$= 5 \times \frac{10}{1000} = .05$

Ans (2).

57
soln

44
Soln.

Eq. wt of metal = 9.

Vap. density of metal chloride = 59.25

Molecular weight of metal chloride = 2 × 59.25
= 118.5

Let the j-factor be x.

and Atomic mass of metal be m.

and Molecular formulae would be.

$M \cdot Cl_x$.

$\Rightarrow m + 35.5x = 118.5$

$\Rightarrow 9x + 35.5x = 118.5$

$\Rightarrow 44.5x = 118.5$

$\Rightarrow x = \frac{118.5}{44.5} = 2.66.$

So j-factor = 2.66.

Atomic Mass = J-factor × Eq. wt

= 2.66 × 9.

≃ 23.9.

Ans (1)

Q 57.

6.023×10^{23} molecule of $C_{60}H_{122}$ weighs 842 g

1 molecule of $C_{60}H_{122}$ weighs $\frac{842}{6.02 \times 10^{23}}$ g

$= 139.86 \times 10^{-23}$ g

$\simeq 1.4 \times 10^{-21}$ g

Ans(4)

Q 58

Soln

6.02×10^{25} HCl chloride molecules have

100 moles

Ans (2)

Q 59

Soln

Ans (3).

Q 60

Soln

$Sn^{2+} \longrightarrow Sn^{4+}$

T.C.I.O.N = 2.

Equivalent weight $= \frac{M}{TCIOS} = \frac{190}{2}$

$= 95.$

Ans (1).

61

soln $Na_2SO_4 . xH_2O$

Molecular weight $= 142 + 18x$.

After heating it lost its water molecule. So.

$$\cancel{\frac{55.9}{142+18x} \times 100 = 18x}$$

$$\cancel{\Rightarrow x}$$

$$\cancel{\frac{55.9}{142+18x} \times 100}$$

$$\frac{55.9}{100} \times (142 + 18x) = 18x$$

$$\Rightarrow x = 10$$

So we have 10 H_2O molecule

Ans (4)

62

soln

$Ca \longrightarrow Ca^{2+}$

$Ca \longrightarrow Ca + 2e^-$

$3Ca \longrightarrow 3Ca + 6e^-$ ①

$Al^{3+} \longrightarrow Al$.

$Al^{3+} + 3e \longrightarrow Al$.

$2Al^{3+} + 6e^- \longrightarrow 2Al$. ②

① + ② $\Rightarrow 3Ca + 2Al^{3+} \longrightarrow 3Ca^{2+} + 2Al$.

Ans (3)

63
Soln $O_2 + 2CO \rightarrow 2CO_2$.

At start 10L 30L

Completion 0 10L 20L.

Ans (1).

64
Soln

0.5 mole Cl is present in 25g of MCl_4.

4 mole Cl is present in $\frac{\cancel{25}^{50}}{0.\cancel{5}} \times 4$ g of MCl_4

$= 200$.

This is molecular weight $= 200 g\ mol^{-1}$.

65
Soln

$H_2O_2 \rightarrow O_2 + 2H + 2e^-$.

$MnO_4^- + 8H + 5e \rightarrow Mn^{2+} + 4H_2O$.

Ans (2).

Q 66
Soln

(1) 32g (3). 100 amu of U.
(2). 80 amu (4). 20g.
(5) 44g of CO_2

Ans (5)

68

soln 68

$$2Ag_2CO_3 \xrightarrow{\Delta} 4Ag + 2CO_2 + O_2.$$

Acc to stoicheo

$$552g \rightarrow \underset{Ag}{432g} + \underset{CO_2}{88g} + \underset{O_2}{32g}$$

$$2.76 \rightarrow ?$$

$$\text{silver residue obtained} = \frac{432}{552} \times 2.76$$

$$= 2.159 \simeq 2.16.$$

Ans (1).

~~Q68~~ Q69

~~Sol 68~~ Sol

11.2 dm^3 of CO_2 at stp is $\frac{1}{2}$ mole of CO_2.

$$2KOH + CO_2 \rightarrow K_2CO_3 + H_2O$$

Acc. to stoich. 2 mole. 1 mole

? $\frac{1}{2}$

1 mole of CO_2 required 2 mole.

$\frac{1}{2}$ mole of CO_2 required $\frac{2}{1} \times \frac{1}{2} = 1$.

1 mole of KOH weighs = 56g.

Ans (1).

70. $H_2S + 2HNO_3 \rightarrow 2H_2O + 2NO_2 + S$.

Soln

$S^{2-} \longrightarrow S^0$.

TCION = 2.

$$Eq.wt = \frac{\text{Molecular Mass}}{\text{TCION}}$$

$$= \frac{34}{2} = 17.$$

Ans (4).

Q 72
Soln

$$2NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$$

From stoich	2	1	1	1.
	0.2	.1	.1	.1.

Ans (1).

~~Q 73~~

~~Soln 73~~

~~Let the weight of O_2 be 1 gm, and the weight of N_2 be 4 gm.~~

$$\frac{\text{Number of molecules in 1 gm of } O_2}{\text{Number of molecules in 4 gm } N_2} = \frac{\frac{N_A}{32} \times 1}{\frac{N_A}{28} \times 4} = \frac{\cancel{28}\,7}{32 \times 4}$$

~~Ans (4).~~

Q 73

soln.

Ans (3)

79

Soln

$[CO]_x$

Molecular Mass $= 28x$.

$= 2 \times V.D$.

$= 2 \times 70 = 140$.

So

$28x = 140$

$x = \frac{\cancel{140}}{\cancel{28}}$ ~~26~~ 5

$x = 5$

Ans (3).

Soln

Moles of 12.2 g benzoic acid $= \frac{12.2}{122} = .1$.

So .1 mole of NaOH required ie 4 gms.

Ans (4).

Soln

Ans (2)

75). $CaCO_3$.

100 gm of $CaCO_3$ contains. 50 proton (mol)

10 gm of $CaCO_3$ contains $\frac{50 \times 6.02 \times 10^{23}}{100} \times 10$

3.01×10^{24} protons.

Ans (1).

76). 18 gm of $H_2O \rightarrow$ give. 16gm O_2.

72,000 gm of H_2O ~~give~~ $\frac{16}{18} \times 72\,000$ gm O_2

$= 64,000. = 64$ Kg.

77). $Eq\,wt = \frac{Mol.\,wt}{TCION}$

$= \frac{158}{5} = 31.6$

Ans (3).

78). Ans 21.

Ans (2)

79

Soln

$NaOH + H_3PO_4 \rightarrow NaH_2PO_4 + H_2O$

ox. No of P.   ox. No of P
+5   +5.

So there is no. oxidation state change.

Equivalent wt would be. Molecular wt = 98.

8

Soln

$Ca(OH)_2 + H_3PO_4 \rightarrow CaHPO_4 + 2H_2O$.

Here, H_3PO_4 having 2. displacable Hydrogen.

So. J-factor = 2.

$$Eq\,wt = \frac{Mol.wt}{J.fac} = \frac{98}{2} = 49.$$

Ans (4).

80

Soln

$M_2O_x + \frac{x}{2}H_2 \rightarrow 2M + xH_2O$

~~Mol.~~

At wt of M = 2 × V.D
= 2 × 32 = 64. gms.

128 gms of Metal is obtained from. (128g + 16x) gm of oxide

$\because$ 3.2 g of metal is obtained from $\frac{128+16x}{128} \times 3.2$ gm of oxide. (36)

$$\frac{128+16x}{128} \times 3.2 = 3.6$$

$$\Rightarrow x = 1.$$

So formulae would be M_2O.

Ans (3).

Soln 8:

Acc to Dulong. petit's Law.

Atomic ~~No~~ Mass $\times$ Specific heat (in $cal\,g^{-1}K^{-1}$) $\simeq 6.4$.

$$\text{Atomic Mass} \times \frac{1.05}{4.2} = 6.4$$

$$\text{Atomic Mass} = 25.6$$

$$\text{Eq wt} = \frac{\text{At wt}}{\cancel{\times n\text{factor}}}\ n_f$$

$$n_f = \frac{25.6}{9} \simeq 3$$

$$\text{Atomic weight} = 9 \times 3 = 27$$

Ans 27 Ans (4)

81

soln

$2H_2O_2 \rightarrow 2H_2O + O_2$.

$68g \rightarrow$ 22400 ml.

$\cdot 68g \rightarrow$ $\frac{22400}{\cancel{68}} \times \cancel{\cdot 68}$

Ans (2)

82

soln.

1L contain 21% O_2.

ie. $\frac{21}{100} \times 1$ l O_2.

$\because$ 22 l of O_2 contain 1mol (at STP).

$\therefore$ $\frac{21}{100}$ of O_2 contain $\frac{1}{22} \times \frac{21}{100}$.

$\Rightarrow \cdot 009$.

Ans (4).

82

soln.

Ans (1).

83 Ans (4).

84) Ans (1).

~~88~~ 87

Soln

1.4 moles of the substance $= 1.4 \times 4 \times 6.023 \times 10^{23}$ atoms

$= 3.372 \times 10^{24}$ atoms.

Ans (4).

~~88~~ 88

soln

Sodium ferrocyanide $= Na_4Fe(CN)_6$.

2 moles of $Na_4Fe(CN)_6$ = 8 moles of N_A.

$= 8 \times 6.023 \times 10^{23}$ atoms of Na.

$= 48.18 \times 10^{23}$ atoms.

Ans(4).

89

soln

No of replacable H = 2.

so n-factor = 2.

Eq. wt $= \frac{\text{At. wt}}{2}$.

$= \frac{98}{2} = 49.$

85

Soln

$$d = \frac{m}{V}$$

$$1 = \frac{18 \times 1.66 \times 10^{-24}}{V}$$

$$= 2.9 \times 10^{-23}\ cm^3$$

$$\approx 3 \times 10^{-23}\ cm^3$$

Ans (4)

Soln

Ans (4) same as Q.87.

Soln

$$d = \frac{mass}{vol.}$$

$$d = \frac{45}{22.4}$$

$$= 2$$

Ans (4)

Soln Same as Q 84.

90

Soln

$Ba(OH)_2 + CO_2 \rightarrow BaCO_3 + H_2O$

.205 mol. .205 mol.

Wt of $BaCO_3$ obtained = .205 × 197

= 40.5g

Ans. (2).

91

Soln

Ans(4).

92

Soln Ans (1).

93

Soln $NH_3 + HCl \rightarrow NH_4Cl$.

solid

	NH_3	HCl
At start.	4L	1.5L
At the end.	2.5L	0

Ans (3)

sol.

17g of NH_3 contain $6.022\times10^{23}\times4$ atoms 93

4.25g of NH_3 contains $\frac{6.022\times10^{23}\times\cancel{4}}{\cancel{17}}\times4.25$

$= 6\times10^{23}$

Ans (4).

soln

$1000 = \frac{75}{18}\times18\times100\times(\Delta T)$.

$\Delta T = 2.4$ K.

Ans (3)

94

soln

Ans (1)

95

soln

$45\times6.02\times10^{23}$ atom/mol

Ans (1).

96

soln

Ans (2)

97

Sol

Let x be minimum Molecular Mass.

$$8\% \quad \frac{8}{100}x = 32$$

$$x = \frac{32 \times 100}{8} = 400.$$

Ans (2)

1

Sol

Ans (4).

sol.

Ans (2)

98

$$\overset{+2}{SCl_2} + S \rightarrow \overset{+1}{S_2Cl_2}.$$

T.C.I.ON = 2.

~~At.wt =~~

$$Eq.wt = \frac{Mol.wt}{T.C.I.ON}$$

$$= \frac{32}{2} = 16.$$

Soln

$\because$ 1.17 g is present in 1 ml

$\therefore$ 1170 g is present in 1000 ml.

No of moles of HCl in 1170 g is

$$= \frac{1170}{36.5} = 32.05$$

Ans (3)

100

Soln

Let x be the minimum molecular weights

$\frac{0.5}{100} \times x = 78.4$ (it contain least one atom of Se)

$$x = \frac{78.4 \times 100}{0.5}$$

$$= 1.568 \times 10^4$$

Ans (1).

101

$BaCO_3 \rightarrow CO_2$

$197g \rightarrow 44g$

$9.85g \rightarrow \frac{44}{197} \times 9.85$

$= 2.2$

44 gm CO_2 have 22.4 l volume.

2.2 gm CO_2 have $\frac{22.4}{44} \times 2.2$.

$= 1.12L$.

Ans (4).

102

$M.W(Na_2SO_4 \cdot 10H_2O) = 346$ gm

346 gm contains = 224 gm of oxygen.

32.2 gm contain $= \frac{224}{346} \times 32.2$ gm of oxygen.

$= 20.8$ gm of oxygen.

103

Ans (2)