Corrections. Med11.

Some Basic Concepts of Chemistry.

Q5

Ans (4)

Q14

Ans 3

Q18

Ans 1 and Ans 2

Q 13

STP needs to mention

Q28 gm-atoms:

Q37

Ans(4) .0093

Q38 3.05 (option (1)).

Q121 (Previous Years Q).

Ans. $.0167 \times 10^{23}$ molecules.

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 (3).

Q.2

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

Ans (4).

Q. 3

Sol^{n}3. Avagadro 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 (4)

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 com, un

⇒ we must have $\left(\frac{96}{4m+96} \times 18.88\right)$ 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

$\Rightarrow m = 27g$

Ans (3).

Q7

Soln

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

First balance the chemical reaction.

$$HgCl_2 + 4KI \longrightarrow \underset{0.4}{K_2HgI_4} + 2KI$$

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

1000g 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).

Q10

Sol 10 If atomic mass of oxygen is taken as 100. then atomic mass of 1 hydrogen becomes 6.25.

So, the molecular mass of water is 100+2(6.25)

= 112.5 g.

So Ans (2).

Q11

Sol 11

The Atomic mass of an element is the average relative mass of different atoms of that element. So Ans (3).

Q12

Soln 12

One mole of Nitrogen gas is the volume of 22.4 litres of Nitrogen. atom at S.T.P.

So Ans (3).

Q13

Sol 13

(a) 11.2 cc of nitrogen and .015 g of Nitric oxide

22400 cc of Nitrogen at S.T.P contains $6.02\times10^{23}\times2$ Nitrogen atoms

10,

11.2cc of Nitrogen at STP contain $\frac{\cancel{2}\times 6.023\times 10^{23}\times \cancel{11.2}}{\cancel{22400}\ \cancel{2000}\ 1000}$ (atoms).

$= 6.023\times 10^{20}$ atoms.

And.

30g of nitric oxide (NO) contains 6.023×10^{23} $\times 2\times$[illegible] atoms. So.

.015g of nitric oxide (NO) contains

$\frac{6.023\times 10^{23}\times 2}{30}\times$ [illegible] .015 g.

$= 6.023\times 10^{20}$ atoms.

So 11.2 cc of Nitrogen and .015 g of nitric oxide contains equal no. of atoms. So.

Ans (1)

Q14

sol 14

(1) .1 g atom of Nitrogen. (N[illegible]).

Mass $= 0.1\times$ [illegible] 14

$=$ ~~2.8g~~ 1.4 g.

(2) .1 mol of NH_3 (ammonia).

Mass $= .1\times 17 = 1.7$ g.

(3) . 6.023×10^{23} molecules of Helium gas. (4).

Mass of Helium gas = ; 4g

(4) 1120 cc of CO_2.

22400 cc of CO_2 has mass. 44 g. (STP).

1120 cc of CO_2 has mass $\frac{44}{\cancel{22400}_{20}} \times \cancel{1120}$

= 2.2 grams.

Ans (3)

Q15

Sol15 The mass of one amu. is approx

1 amu = 1.66×10^{-24} g.

Ans (3)

Q16

Sol16

Equal volume of different gases. at any temperature. and pressure have. equal no. of molecules.

Ans (4).

Q17

Ans17

~~(3)~~ Ans 3.

Q18

Sol 18. Volume occupies by gas depends upon conditions

Ans (2) and (3)

22 g of CO_2 = ·5 mole of CO_2.

·5 mole CO_2 contains 0·5 mole of C,

1 mole of oxygen atom.

So Ans(2). and Ans (1).

Q19

Sol 19.

Equal volume of all gases. contains equal no. of molecules at same temperature and pressure.

So Ans (C).

Q20

Sol 20

(1) 0.2 mol of H_2

1 mol of H_2 occupy 22.4 l at STP.

0.2 mol of H_2 occupy 22.4 × 0.2 l at ST.

= 4.48 l.

(2). 12.8 g of SO_2.

64g of SO_2 occupy 22.4l at STP.

12.8 g of SO_2 occupy $\frac{22.4}{64} \times 12.8$ ~~g~~ l at STP. (5)

$= 4.48$ l at STP.

(3) 3.2 g of O_2.

32 g of O_2 occupy 22.4 l at STP.

3.2 g of O_2 occupy $\frac{22.4}{\cancel{32}} \times \cancel{3.2} = 2.24$ l at STP.

So Ans (3).

Q21

Sol 21

Milliequavelent $= M.V$

$= .1.0 \times 100 \times 2$

$= 200.$

Ans (4).

Q22

Sol 22

Its Dulong Petit's law.

Ans (4).

Q23

Sol 23

C-12 : 98%

C-14 2%.

100 g contains · 2g of C-14.

⇒ 100 g contains · $\frac{2}{14} \times 6.023\times10^{23}$ atoms of C-14.

So 12g contains $\frac{2}{14}\times\frac{6.023\times10^{23}}{100}\times 12$ atoms of C-14

= ~~10.32~~ · $\cdot1032\times10^{23}$ atoms of C-14

= 1.032×10^{22} atoms of C-14

atoms

Ans (2).

Q24
Sol24

22.4 l of H_2 at STP weights about ·2g·

20 l of H_2 at STP weighs about $\frac{2}{22.4}\times 20$ g

$=1.8$ g ·

Q25
Sol25

Element	%	Mole ratio	Simple mole ratio
N	26	$\frac{26}{14}=1.857$	$\frac{1.857}{1.857}=1$
O	74	$\frac{74}{16}=4.625$	$\frac{4.625}{1.857}\simeq2.5$

Emprical formulae. would be $NO_{2.5}$

also N_2O_5

So Ans (4)

Q26

Sol26

Empirical formulae. = CH_2.

It is given that mass of one litre of this organic gas is exactly equal to that of one litre of N_2. This means both of these gases have same molecular mass.

So Molecular mass of organic compound is 28 grams.

Empirical Mass = 14.

So factor is = $\frac{28}{14} = 2$.

So Molecular formulae becomes $2 \times CH_2$

ie C_2H_4.

Ans (1)

Q27

Sol 27

1 mol of H_2SO_4 contain 98g of H_2SO_4.

·25 mol of H_2SO_4 contains 98 × ·25 g of H_2SO_4.

= 24.5 g of H_2SO_4.

Ans (2).

Q28

Sol 28

32 g of S contains 1 N_A atoms of S.

80.25 g of S contains $\frac{1N_A}{32} \times 80.25$ N_A of S

= 2.5 N_A of atoms.

Q29

Sol 29

1 mol of $(NH_4)_3PO_4$ contains 12 mol of H.

3.18 mol of H atoms are present in 265 mol of $(NH_4)_3PO_4$.

1 mol $(NH_4)_3PO_4$ contains 4 moles 'oxygen' atom.

·265 mol $(NH_4)_3PO_4$ contains 4 × ·265 moles 'O' atom

= 1.06 moles of 'O' atoms

Ans (3).

Q30 ⑮

Sol 30.

1.5 moles of oxygen is present in 0.5 moles of $BaCO_3$.

Ans (1).

Q31

Sol 31

$$2KClO_3 \longrightarrow 2KCl + 3O_2.$$

2 mol

3 mol

3 × 22.4 l at STP.

3 × 22.4 l of O_2 is obtained from 2 mol $KClO_3$.

11.2 l of O_2 is obtained from $\frac{2 \times 11.2}{3 \times 22.4}$ moles of $KClO_3$.

$= \frac{1}{3}$ mol of $KClO_3$.

Ans (2).

Q32

Sol 32

$$A + 2B \longrightarrow C.$$

5 8

A is in excess. and B is limiting Reagant

2 mol B → 1 moles of C.

8 mol B → $\frac{1}{2}$ × 8 moles of C = 4 mol of C

Ans (2).

Q34

Sol 34

Moles of NaCl is more than that of KCl. so the molarity of NaCl is more if the volume of solutein is same.

Ans (3).

Q35

Sol 35

$$N_1V_1 + N_2V_2 \Rightarrow N_3V_3 .$$

$$\frac{1}{\cancel{2}} \times \overset{100}{\cancel{200}} = \frac{1}{10} \times (200 + V_3)$$

$$1000 = 200 + V_3$$

$$\Rightarrow V_3 = 1000 - 200$$

$$= 800 \text{ cc}$$

Ans 3

Q36

$$\text{Molarity} = \frac{720}{18} \times \frac{1000}{720}$$

$$= 55.5\text{M}$$

Ans (3).

Q33

Ans (2)

$$\text{Molarity} = \frac{\text{Volume strenth}}{11.2}$$

Ans (2)

Q37

Sol 37 1l of Air contains .21 l of O_2

22.4 l of O_2 contains 1 mole O_2.

.21 l of O_2 contains $\frac{1}{22.4} \times .21$ moles.

$= .0093$ Ans(4).

Q38

Sol 38

$$\text{Eq. mass} = \frac{\text{At. Mass}}{\text{K-factor}}$$

$$= \frac{9.15}{3} = 3.05$$

Ans(1).

Q39

Sol 39

No of equivalent of both metals are same

$$\frac{m_1}{E_1} = \frac{m_2}{E_2}.$$

$$\Rightarrow E_1 = \frac{m_1}{m_2} \times E_2$$

Ans (1).

Q90.

Sol 90. Ans (4).

Q41

Sol41

Mole fraction of solute. $= \dfrac{\text{Moles of solute}}{\text{Moles of solute + Moles of solvent}}$

Moles of solute $= 1$

Moles of solvent $= \dfrac{1000}{18} = 55.5$
(since solution is aq. (H_2O)).

Mole fraction of solute $= \dfrac{1}{55.5+1}$.

$= .0176$.

Ans-(1).

LEVEL-02

1) $N_2 + 3H_2 \rightarrow 2NH_3$.

$1 \quad 3 \quad 2.$

$\frac{\text{Initial volume}}{\text{Final volume}} = \frac{4}{2} = 2:1.$

2). Millimoles of HCl $= 50 \times 0{\cdot}1$

$= 5$

Millimoles of NaOH $= 50 \times 0{\cdot}1.$

$= 5.$

$HCl + NaOH \rightarrow NaCl + H_2O$

millimoles 5 5 5 5

100 ml of solution. 5×10^{-3} mol of NaCl is present.

1000ml of solution contain $\frac{5\times10^{-3}}{100} \times \cancel{1000}$ mol. of NaCl.

$= {\cdot}05$ mol.

which is also the molarity $= {\cdot}05$ M.

Q3
Sol3

meq of NaOH = $\frac{1}{10}\times 100$

$= 10$ meq.

eq of NaOH = 10×10^{-3} eq.

eq of NaOH = eq of dibasic acid.

$= 10\times10^{-3}$.

eq of dibasic acid = $\frac{wt}{\frac{\text{Molecular wt}}{2}}$

$$10\times10^{-3} = \frac{.\overset{59}{\cancel{84}}\times 2}{M}$$

$$\Rightarrow M = \frac{.\overset{59}{\cancel{84}}\times 2}{10\times10^{-3}} = 118$$

Ans (2).

Q4
Sol4

Meq of H_2SO_4 = $\frac{1}{2}\times 40$

$= 20\cdot$ meq.

$= 20\times10^{-3}$ eq.

This is also the equivalent of metal So.

$$\frac{.84}{Eq.wt} = 20\times10^{-3} \Rightarrow Eq.wt = \frac{.84}{20\times10^{-3}} = 42$$

Ans (3)

5

Sol5 ② Let At mass of metal be m. and oxide be M_2O_x.

$M_2O_x \longrightarrow 2M.$

$(2m+16x) \rightarrow (2m).$

gm 2g.

$3.15 \longrightarrow ?$

We get 2m gms of metal from 2m+16x metal oxides

So we get $\frac{2m}{2m+16x} \times 3.15$ gm of metal from 3.15 g metal oxides.

$$\Rightarrow \frac{6.3m}{2m+16x} = 1.05$$

$$\Rightarrow 6.3m = 2.1m + 16.8x$$

$$\Rightarrow 4.2m = 16.8x.$$

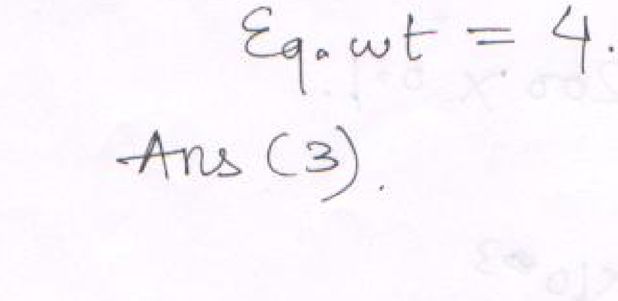
$$\Rightarrow \frac{m}{x} = \frac{16.8}{4.2} = 4.$$

Eq. wt = 4.

Ans (3).

6

Sol6



C_6H_{12} 84. gms.

C_6H_{10}. 82 gms.

yield = 75%

So $\frac{75}{100} \times 84$ converts to cyclohexene.

= 63 gms cyclohexane converts to cyclohexene.

84 g cyclohexane gives 82 g cyclohexene.

63 g " " $\frac{82}{84} \times 63$ cyclohexene

61·4 g cyclohexene

Ans (1).

Q7
Sol

For complete Nuetralization.

$Meq_{\text{Metal Carbonate}} = Meq_{HCl}$.

$$\frac{1 \times 10^{3}}{Eq.wt} = 200 \times 0.1.$$

$$\Rightarrow Eq.wt = \frac{1 \times 10^{3}}{200 \times .1}$$

$$= 50$$

Ans ~~3~~ (1)

$\frac{8}{\text{Sol}}$

Consider 100ml of solution.

Mass of 100ml solu^n = $100 \times .885$

$= 88.5$ gms.

Mass of ammonia present = $\frac{23}{100} \times 88.5$

$= 20.35$ gms.

No of eq of ammonia = $\frac{20.35}{17} = 1.2$.

so 1.2 eq of ammonia present in 100 ml. solu^n.

So, 1000ml sol^n contain = $\frac{1000}{100} \times 1.2$

$= 12$ eq.

which is also the normality.

So Ans (2).

Q9

Eq. of ammonia = Eq of H_2SO_4.

$= 100 \times \frac{1}{5} \times 10^{-3}$.

$= .02$.

wt of ammonia. = Eq. wt × No of eq.

$= 0.02 \times 17$

$= \cancel{0}.34$.

$\%$ composition of Ammonia $= \frac{.34}{1.7} \times 100$.

Ans (2) 20%

Q10

$\frac{7.35}{\text{Eq.wt (acid)}} \times \frac{\overset{4}{\cancel{1000}}}{\cancel{250}} =$ Normality (N_1) of acid.

for complete nuetralization.

$N_1V_1 = N_2V_2$

$\frac{29.4}{\text{Eq wt}} \times 25 = 15 \times 1$.

Eq wt = 49.

Atomic wt = 49 × 2 = 98 Ans(1)

Q17.

Sol

$$ppm = \frac{w}{w+W} \times 10^6.$$

$$= \frac{.2}{500.} \times 10^6.$$

$$= 400\ ppm.$$

Ans (3).

~~17~~

~~Sol~~

~~$\frac{1}{200}$th.~~ **Q12**

Soln12

$210 \rightarrow 6.02 \times 10^{23}$ atoms

$10^{-3} \rightarrow \frac{6.02 \times 10^{23}}{210} \times 10^{-3}$.

$.028 \times 10^{20}$ atom.

$\frac{1}{200}$ th atoms of Po convert to Pb in 1 day.

$\frac{1.0}{200} \times .028 \times 10^{20}$ atom converts in. 1 day.

$= 1.4 \times 10^{16}$ atom

≈ Ans (1).

Q13
Sol13

195×10^{-3} g is present 1ml. soln.

195 g is present in 1000 ml soln.

$\frac{195}{39}$ mole of K^+ is present in. 1000 ml soln

(Defination of molarity)

Ans (2).

Q14

Sol14.

Meq of HCl = $100 \times \cdot 3 = 30$ · meq

Meq of $H_2SO_4 = 200 \times \cdot 6 = 120$ · meq.

~~neutralization meq of H_2SO_4 left~~

$= 120 + 30$ meq

$= 150$ meq.

$$\text{Normality} = \frac{\text{No of equivalent} \times \cancel{1(ml)}\,1000}{\cancel{1000} \cdot V(ml)}$$

$$= \frac{\overset{3}{\cancel{150}} \times \cancel{10^{-3}} \times \cancel{1000}}{\underset{10}{\cancel{300}}} = 0.5$$

$=$ $\cdot 5$ N

Ans (3)

Q15

Sol15 Butane
Isobutane $\}$ = C_4H_{10}

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

Acc to stoich → 58 Kg 208 Kg.

1 Kg ?

∵ 208 Kg of oxygen is required to combust 58 Kg C_4H_{10}.

∴ $\frac{208}{58}$ Kg of " " " " " 1 kg C_4H_{10}

= 3.58

So Ans (4).

16 Soln

40g of Caustic Soda contain. N_A ~~atoms~~ ions (Na).

4 g of " " " $\frac{N_A}{10}$ Na^+.

(i). ~~100~~ 106 g contains $2N_A$ Na^+

10.6g contains $\frac{\cancel{2}N_A}{106\cancel{0}} \times \cancel{10.6}$ Na^+ $\cancel{10}$ 5

$\frac{1}{5}$ Na ions.

(ii). 58.5 g of NaCl contains. $1N_A$ Na ions.

(iii). Moles Na_2SO_4 = $\frac{1\cancel{00} \times 0.5}{1\cancel{000}}$

= $\frac{5}{100}$ moles.

1 Mole contain $2N_A$ ions.

$\frac{5}{100}$ mole contains $\frac{2 \times 5}{100} N_A$ ions = $\frac{1}{10} N_A$. Na^+

So Ans (3).

Q17

Sol17.

(i) 2.5 g-molecules. of N_2.

$\equiv$ 2.5 moles N_2

$\equiv$ 2.5 N_A molecules of N_2.

(ii). 4g atom. of nitrogen

2g-molecules of N_2.

2 N_A molecules of N_2.

(iii). 30.1×10^{23} N atoms.

$\frac{30.1 \times 2}{2} \times 10^{23}$ N atom.

$\frac{60.2}{2} \times 10^{23}$ N atom.

$\frac{10 N_A}{2} \times 10^{23}$ N atom.

$2.5 N_A \times 10^{23}$ N_2 molecules.

(iv). 28g contains 1 N_A

82g contains $\frac{1}{28} \times 82 = 2.9 N_A$.

So Ans (iv).

18.

$CO_2 . (4.4 g) . = .1 \text{ mol} . = 6.023 \times 10^{22}$. molecule

H_2 $(2.24 L) . = .1 \text{ mol}. = 6.023 \times 10^{22}$ molecule.

Total = , 12.046×10^{22} molecule

$= 1.204 \times 10^{23}$ molecules

Ans (2).

19

0.5 moles $(H^+ + H_2O)$ is obtained from. 20 g .

1 moles H^+ is obtained from $\frac{20}{0.5} \times 1 = 40 g$.

Acc to defination this would be equivalent wt .

Ans (1) 40

20.

Wt of C-14 in 12 g sample.

$= \frac{2}{100} \times 12$ gm.

= .24 gm.

14g of C-12 → 6.022×10^{23} C-14 atoms.

.24 of C-12 → $\frac{6.022 \times 10^{23}}{14} \times .24$.

$= \underline{1.032 \times 10^{22} \text{ atoms}}$

21). No of oxygen atom in 1g O_2

$$\frac{1}{\cancel{32}\ 16} \times \cancel{2} \times N_A = \frac{1}{16} N_A$$

No of $\overset{\text{O atom}}{\wedge}$ 1g O_3 atom. $\frac{1}{48} \times 3 \times N_A$

$$= \frac{1}{16} N_A$$

No of O in 1gm O $= \frac{1}{16} N_A$

So Ans (4).

33

Asertion and Reasoning type Question.

1).
Ans (5).
Volume of gas. is directly proportional to the.
number of moles of a gas.

2). Ans (5).
Molecular weight of oxygen is 32.

3) Ans (3.).

4). Ans (5)

5). Ans (4)

6). Ans (1).

7)

8). Ans (1) Law of constant proportion.

9). Ans (2)

10). Ans (1).

11). Ans (5).

12) Ans (1)

13) Ans (1)

PREVIOUS YEAR's QUESTION

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).

Q2.

Sol2

$N_2 + 3H_2 \rightarrow 2NH_3$.

20Kg 3Kg.

Acc to stiocheometry.

N_2 is in excess and Hydrogen (H_2) is a limiting reagant

so 6Kg H_2. gives 34 Kg of NH_3

so 3Kg of H_2 gives 17 Kg of NH_3.

Ans.(1).

Q3

Sol3

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

so Ans(3)

Q4

Soln.

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

Ans(1)

Q.5

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.6

Soln 6

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

$$2M + \frac{1}{2}O_2 \rightarrow M_2O_x.$$

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

mass mass.

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

Ans.(3).

Q7. C : H : O

24g 4g 32.

mole ratio 2 : 4 : 2 = 1 : 2 : 1 Ans(2).

Q8 ㊲ Let the amount of $CaCl_2$ be x.

Sol8 $CaCl_2 + Na_2CO_3 \longrightarrow CaCO_3 + 2NaCl$.

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

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

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

So amount of $CaCl_2$ present in mixture is 1.1gm and amount of NaCl present in mixture is.

㊳

4.44gm − 1.1gm

= 3.34 gm of NaCl.

% composition of NaCl in a mixture is

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

Ans (1).

Q9

Sol 9

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

= 1.43g oxygen.

Ans (1).

Q10. 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)

Q11

Soln11

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 gm/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.

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

Ans (4)

Q12

Soln12

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

·1 mole of triatomic gas contain

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

1.806×10^{23} atoms.

Ans (2).

Q13

Soln13 17g NH_3 contains. $4 \times 6.023 \times 10^{23}$ atoms.

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

Ans (1)

Q14.

soln14

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

2×56g of M is present in $\frac{40}{2.8} \times 2 \times 56$ of M_2O_x

$= 160$ g of M_2O_x.

So, this would be molecular weight

160g of M_2O_x contains $2 \times 56 = 112$g of M.

and 48g of O.

⇒ These are 3 oxygen atoms.

Q15

soln15

No of milli equivalents ~~10~~ = NV (ml).

$= .02 \times 100$

$= 2$

No of equivalent $= 2 \times 10^{-3}$.

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

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

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

$= 6.023 \times 10^{20}$ molecules.

Q16

Soln16 $NH_2OH \longrightarrow N_2O$

ox. No of N = −1

ox. No of N. = +1

J-factor = change in oxidation state

= 2.

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

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

Ans (2).

Q17.

Soln17 Mass of $1e^-$ = 9.1×10^{-28} g

= Mass of 1mol $(6.023 \times 10^{23}) e^-$ =

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

= .55 mg.

Ans (2).

Q18

Soln 18 No of milli equivalents of HCl

= NV (ml)

= 1×100 = 100 meq.

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

~~Eq wt of M = No. of eq. X weight =~~

·1 eq contains ·9 g of metal.

1 eq contain 9 g of metal.

This would be the equivalent weight of M.

Q19

Solⁿ 19

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)

Q20

Soln20.

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).

24)

Soln 24

2N H_2SO_4 has volume $0{\cdot}1\ dm^3$.

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

$$N_1V_1 = N_2V_2$$

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

$$\Rightarrow V_2 = 2.$$

Ans (3)

Q25

Soln25

18g → 6.023×10^{23} molecules

NA molecules.

18×10^{-3} → $N \times 10^{-3}$ molecules.

Ans (1).

Q26

Soln26

Assuming it contain 1N atom.

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

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

$$x = \frac{\overset{70}{\cancel{1400}}}{\cancel{20}},$$ Ans(1) 70.

Q21

Soln21

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 × 2 (48 + 14).

= 188 g.

Ans (3).

Q22

Soln22

Ans (5).

Q23

Soln23

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 $\frac{\cancel{1.5}\,5}{\cancel{.6}\,3} \times \cancel{70}\,35$ = 175 g of $CdCl_2$.

Molecular Mass of $CdCl_2$ = 175 g.

Atomic Mass of Cd = 175 − 70

= 105 g.

Ans (3)

Q27

Soln27

$2H_2 + O_2 \rightarrow 2H_2O$.

4g   32g   36g.

10g   64g   ?

O_2 : Limiting Reagant

H_2 : Excess.

32g O_2 → 2moles of H_2O

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

Ans (2).

Q28

Soln28.

$C + O_2 \rightarrow CO_2$.

12g   32g   22.4L (at NTP).

Ans (2).

Q29

Sol29. In $MnSO_4$.

ox. state of Mn = +2.

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).

Q30

Soln30

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.

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

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

Ans (~~[illegible]~~) ·15·

Ans (3)

Q 31

Soh 31

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

50ml × 0.5M   25milli moles.

25millimoles.

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

$CaCO_3 + 2HCl \rightarrow$ ~~[illegible]~~ $CaCl_2 + H_2CO_3$.

25millimoles.

So 25 millimoles required 50 millimoles of HCl. for nuetralization.

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

$\cdot1 \times V_{HCl} = 50$.

$\therefore V_{HCl} = \frac{50}{\cdot1} = 500ml$.

Ans (2).

Q32.

Soln32

27 g contains 6.023×10^{23} Al atoms.

4.5×10^{-5} g contains $\frac{6.023\times10^{23}}{\cancel{27}\,6}\times\cancel{4.5}\times10^{-5}\times10^{23}$ Al atoms.

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

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

Required number of $e^- = \frac{3\times6.023}{6}\times10^{18}$

$= 3.01\times10^{18}\,e^-$.

Ans (2).

Q33

Soln33.

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

$16g \quad 2\times22.4L$ (at STP).

∵ 16g of Methane require $2\times22.4L$ of O_2.

∴ 4g of Methane require $\frac{\overset{11.2}{\cancel{2\times22.4L}}}{\cancel{16}\,\cancel{4}\,2}\times\cancel{4}=11.2L$ of O_2

Ans (1).

Q35

Soln 35

1 atom weighs — 1.8×10^{-22}.

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

$= 108.36$

Ans (3)

Q.34

Soln 34.

Ans. $KMnO_4 \xrightarrow{\text{Alkaline}} MnO_2$ +4.

TCIOS. = 3.

(total change in oxi. state).

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

Ans (2)

Q 36

Soln 36 $PH_3 \xrightarrow{\Delta} P + \frac{3}{2} H_2 \uparrow$.

100 ml 1~~00ml~~ (solid). $\frac{3}{\cancel{2}} \times \cancel{100}\,50 = 150$ ml

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

Q 37

Soln 37

$$2C + O_2 \rightarrow 2CO.$$

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

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).

Q38

Soln38

Ans (2).

Q39

Soln39

1 mole methane = 16gm.

·1 mole methane = 1.6 g.

Ans (3)

40

Soln 40 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.

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

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

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

Ans (1)

41 ⑸②

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

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

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

$$\Rightarrow E = 9g$$

Ans(4).

44

Soln

First oxide.

↙

~~88~~ 78% 22%

Fe O.

Suppose 78g 22g

106g. 30g.

Second oxide.

70% 30%

Fe O.

70g 30g.

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

Ans(1).

45

Soln

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

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

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

Ans ·6.

Ans(1)

Q46

Soln46

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

1L 5L

Ans(3)

47

Soln47.

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

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 $PbCl_2$

⟹ .029 mol of $PbCl_2$

Ans (4)

48

Soln48 Fe^{2+} is present in Mohr's salt is oxidised to Fe^{3+}. So change in Oxidation no. is 1

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

49

Soln

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

Ans (3).

50

Soln

$C + O_2 \to CO_2$

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

$\frac{1\cancel{0}}{10\cancel{0}} \times 4\cancel{0} = 4g$ carbon unreacted

so only 36 g of C reacted.

$C + O_2 \to CO_2$.

36 ?

12g → 22.4 l

36g → 22.4 × 3 L.

= 66.2 L

Ans (2)

51

Soln

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

Ans (3)

52

Soln52

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

$8H^+$ $+ 4H_2O$

$+ 5e$

so $5e^-$ gets transfer.

Ans (2)

Q53

Soln53

(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).

55.
Soln

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

Ans. (2)

56
Soln

J. factor $KMnO_4 = 5$

No of millimoles of $KMnO_4$ present $= MV(ml)$

$= 250 \times .04$

$= 10.$

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

No of equivalent is = j-factor × Moles

$= 5 \times \frac{10}{1000} = .05$

Ans (2).

57
soln.

54.
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)

567

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

1 molecule of $C_{60}H_{122}$ weighs $\frac{842}{6.02\times10^{23}}$ g

$= 139.86\times10^{-23}$ g

$\simeq 1.4\times10^{-21}$ g

Ans(4)

Q58

Soln

6.02×10^{25} HCl chloride molecules have

100 moles

Ans (2)

Q59

Soln 59

Ans (3).

Q60

Soln 59

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

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.

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

~~$\Rightarrow x$.~~

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

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

$\Rightarrow x = 10$.

So we have 10 H_2O molecule

Ans (4)

62

soln

$Ca \rightarrow Ca^{2+}$

$Ca \rightarrow Ca + 2e^-$

$3Ca \rightarrow 3Ca + 6e^-$ ①

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

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

$2Al^{3+} + 6e^- \rightarrow 2Al$. ②

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

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 $\frac{\overset{50}{\cancel{250}}}{0.\cancel{5}} \times 4$ g of MCl_4

$= 200$.

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

65
soln

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

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

Ans (2).

Q66
Soln

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

Ans (5)

67

soln 67

68

soln 68

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

Acc to stoicheo

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

$$2.76 \longrightarrow ?$$

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

$= 2.159 \simeq 2.16.$

Ans (1).

~~Q68~~ Q69

~~Sol 68~~ Sol69

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).

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

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.

$$\frac{\text{Number of molecules in 1gm of } O_2}{\text{Number of molecules in 4gm } N_2 .} = \frac{\frac{NA}{32} \times 1}{\frac{NA}{28} \times 4.}$$

$$= \frac{\cancel{28}7}{32 \times \cancel{4}}$$

Ans (4).

Q 74

soln 74.

Ans (3)

75
Soln

$[CO]_x$

Molecular Mass $= 28x$.

$= 2 \times V.D$.

$= 2 \times 70 = 140$.

So

$28x = 140$

$$x = \frac{\cancel{140}}{\cancel{28}}{}^{2\cancel{6}\ 5}_{\cancel{4}}$$

$x = 5$

Ans (3).

76
Soln

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

so .1 mole of NaOH required ie 4 gms.

Ans (4)

77
Soln

Ans (2)

78). $CaCO_3$.

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

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

3.01×10^{24} protons.

Ans (1).

79). 18 gm of $H_2O \rightarrow$ give . 16gm O_2 .

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

$= 64,000. = 64$ Kg .

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

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

Ans (3).

81). Ans 21.

Ans(2)

82

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[illegible]

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).

84

Soln

$M_2O_x + \frac{1}{2}H_2 \rightarrow 2M. + xH_2O$.

~~Mol.w~~

At wt of M = 2 × V.D

= 2 × 32 = 64. gms.

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

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

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

$$\Rightarrow x = 1.$$

So formulae would be M_2O.

Ans (3).

85

Soln 85 Acc to Dulong. petit's Law.

Atomic ~~No~~ Mass × Specificheat ≈ 6.4. (in $Cg^{-}K^{-1}$).

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

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

$\text{Eq wt} = \frac{\text{At wt}}{nf}$ ~~× nfactor~~

$nf = \frac{25.6}{9}$ nf ≈ 3

Atomic ~~A~~ weight $= 9 \times 3 = 27$

Ans 27 Ans (4)

86
soln

$2H_2O_2 \rightarrow 2H_2O + O_2$.

68g → 22400 ml.

·68g → $\frac{22400}{\cancel{68}} \times \cancel{\cdot 68}$

Ans (2)

87
soln.

1L contain 21% O_2.

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

∵ 22 l of O_2 contain 21mol (at STP).

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

$= .009$.

Ans (4).

88
soln.

Ans (1).

89 Ans (4).

90) Ans (1).

$\frac{95}{\text{soln}}$

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).

$\frac{96}{\text{soln}}$

Sodium ferrocynide = $Na_4Fe(CN)_6$.

2moles of $Na_4 Fe(CN)_6$ = 8 moles of NA.

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

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

Ans(4).

$\frac{97}{\text{soln}}$

No of replacable H = 2.

so j-factor = 2.

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

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

98

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).

99

Soln

Ans (4).

100

Soln Ans (1).

101

Soln $NH_3 + HCl \rightarrow NH_4Cl$.

solid

At start: 4L 1.5L

At the end. 2.5L 0.

Ans (3)

102

sol.

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

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

$= 6\times10^{23}$

Ans (4).

103

soln

$1000 = \frac{75}{18}\times 100\times(\Delta T).$

$\Delta T = 2.4$ K.

Ans (3)

104

soln

Ans (1)

105

soln

$45\times6.02\times10^{22}$ atom/mol

Ans (1).

106

soln

Ans (2)

107
Sol

Let x be minimum Molecular Mass.

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

$$x = \frac{32\times100}{8.} = 400.$$

Ans (2)

10[illegible]
Sol

Ans (4).

109
sol. Ans (2)

110.
s[illegible]

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

T.C.I.ON = 2.

~~At.wt =~~

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

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

111
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)

112
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).

1123.
Sol

$$Mg^{2+} + Na_2CO_3 \rightarrow MgCO_3 + 2Na^+.$$

Acc. to stocheometry. $24g. \quad 130g$

24g of Mg^{2+} requires 130g of Na_2CO_3

$12\times10^{-3}g$ of Mg^{2+} requires $\frac{130}{24}\times12\times10^{-3}g$ Na_2CO_3

$.\ 64.99\times10^{-3}g$ $NaCO_3$

Milli Moles of $Na_2CO_3 = \frac{64.99}{130} = 0.5$

Milli Eq of $Na_2CO_3 = 2\times0.5$
$= 1.$

Alternate:

$24g\ Mg^{2+} \rightarrow 1$ milli moles of Na_2CO_3.

$12g\ Mg^{2+} \rightarrow \cancel{\frac{1}{24}\times12}$ 0.5 milli moles of Na_2CO_3.

Milli eq. of $Na_2CO_3 = 0.5\times2$
$=1.$

Ans. (1).

114

$BaCO_3 \rightarrow CO_2$

$197g \rightarrow 44g$.

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

$= 2.2$

44gm CO_2 have 22.4l volume.

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

$= 1.12L$.

Ans (4).

115 $M.W(Na_2SO_4 \cdot 10H_2O) = 346$ 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.

116

Sol. Ans (2)

117

sol.

$$\text{Mol. wt} = V.D \times 2$$
$$= 22 \times 2$$
$$= 44$$

Ans (3)

118

sol

The oxidation number of molecule must be 0

$A = +2$

$B = +5$

$C = -2$

(i). $A_3(BC_4)_2$

$+2 + 6 + 10 - 16 = 0$

So Ans (1).

119

sol

Ans (2)

120.

sol.

$$\text{Eq wt of } SO_2 = \frac{\text{Mol. wt}}{\text{TCION}} = \frac{64}{4} = 16$$

Ans is the value twice the eq. mass $= 16 \times 2$
$= 32$

Ans (2).

121

1ml (1gm) have 20 drops. $\quad d = 1\,gm/cm^3$

1 drop have volume $\frac{1}{20}$ ml. ($\frac{1}{20}$ gm)

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

$$\frac{1}{20}g \rightarrow \frac{6.023 \times 10^{23}}{18} \times \frac{1}{20}.$$

$\rightarrow 0.0167 \times 10^{23}$ molecules.