

Topic :- SOME BASIC CONCEPTS OF CHEMISTRY

- 1 (c)
As ratio of masses of nitrogen per gram of hydrogen in hydrazine and NH_3
 $= 1 \frac{1}{2} : 1$
 $= \frac{3}{2} : 1$ or $3 : 2$
ie, the law of multiple proportions.
- 3 (a)
Eq. of $H_2SO_4 = 0.5 \times 2 = 1.0$;
Eq. of $Ca(OH)_2 = 0.2 \times 2 = 0.4$;
Equal Eq. reacts and thus, Eq. of $CaSO_4$ formed = 0.4
 \therefore Mole of $CaSO_4$ formed $\frac{0.4}{2} = 0.2$
- 4 (d)
 H_3PO_4 is tribasic acid and thus,
 $N = M \times \text{basicity}$
- 5 (d)
Empirical formula wt. = 13
 $\therefore n = \frac{\text{mol. wt.}}{\text{empirical formula wt.}} = \frac{78}{13} = 6$
 \therefore Formula is $(CH)_6$, *i.e.*, C_6H_6
- 6 (a)
For first oxide,
Moles of oxygen = $\frac{22}{16} = 1.375$,
Moles of Fe = $\frac{78}{56} = 1.392$
Simpler molar ratio, $\frac{1.375}{1.375} = 1, \frac{1.392}{1.375} = 1$
 \therefore The formula of first oxide is FeO.
Similarly for second oxide,
Moles of oxygen = $\frac{30}{16} = 1.875$,
Moles of Fe = $\frac{70}{56} = 1.25$

$$\text{Simple molar ratio} = \frac{1.875}{1.25} = 1.5, \frac{1.25}{1.25} = 1$$

∴ The formula of second oxide is Fe_2O_3 .

Suppose in both the oxides, iron reacts with x g of oxygen.

∴ Equivalent weight of Fe in FeO

$$\frac{\text{weight of Fe}_{\text{II}}}{\text{weight of oxygen}} \times 8$$

$$\frac{56}{2} = \frac{\text{weight of Fe}_{\text{II}}}{x} \times 8 \quad \dots(\text{i})$$

∴ Equivalent weight of Fe in Fe_2O_3

$$= \frac{\text{weight of Fe}_{\text{III}}}{\text{weight of oxygen}} \times 8$$

$$\frac{56}{3} = \frac{\text{weight of Fe}_{\text{III}}}{x} \times 8 \quad \dots(\text{ii})$$

From Eq. (i) and (ii),

$$\frac{\text{weight of Fe}_{\text{II}}}{\text{weight of Fe}_{\text{III}}} = \frac{3}{2}$$

7

(a)

We know that protons in 1 mole CaCO_3

= atomic number of calcium + atomic number of carbon + 3 (atomic number of oxygen)

$$= 20 + 6 + 3(8) = 50 \text{ mol}$$

$$\therefore \text{Proton in 10 g } \text{CaCO}_3 = \frac{10 \times 50}{100} \times 6.02 \times 10^{23}$$

$$= 3.01 \times 10^{24}$$

8

(b)



But the yield is 11.2.

$$\therefore \% \text{ yield} = \frac{11.2}{22.4} \times 100 = 50\%$$

9

(b)

$$N = \frac{1}{49 \times (100/1000)} = 0.2$$

10

(c)

One mole of electrons = 6.023×10^{23} electrons

Mass of one electron = 9.1×10^{-28} g

Mass of one mole of electrons

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

$$= 5.48 \times 10^{-4} \text{g} = 0.548 \text{ mg}$$

$$\approx 0.55 \text{ mg}$$

11

(c)

Eq. of metal = Eq. of Cl

$$\therefore \frac{74.4 - 35.5}{E} = \frac{35.5}{35.5}$$

$$\therefore E = 38.9$$

12

(a)

Equivalent wt of acid

$$= \frac{\text{molecular weight of acid}}{\text{no. of H atoms replaced during reaction}}$$

\therefore Equivalent weight of acid depends on the reaction involved because different number of acids are replaced during different reactions.

14

(d)

$$\text{At. wt.} = 2 \times 31.82$$

$$\therefore \text{Wt. of one atom} = \frac{2 \times 31.82}{N} = \frac{63.64}{N}$$

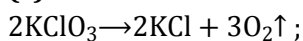
15

(a)

22.4 litre = 1 mole;

$$\therefore 1 \text{ m}^3 = 10^3 \text{ litre} = \frac{10^3}{22.4} = 44.6$$

16

(c)245 g KClO_3 on heating shows a wt. loss = 96 g (of O_2) \therefore 100 g KClO_3 on heating shows a wt. loss

$$= \frac{96 \times 100}{245} \text{ g} = 39.18\%$$

17

(b)

$$\text{Meq.} = \text{Normality} \times V \text{ in mL}$$

$$= 500 \times 0.2 = 100$$

18

(a)

$$\text{Number of molecules} = \frac{\text{mass} \times N_A}{\text{molar mass}}$$

19

(d) $3\text{F}^- \equiv 1 \text{ Formula unit (AlF}_3)$

$$3.0 \times 10^{24} \text{F}^- = 1 \times 10^{24} \text{ Formula units (AlF}_3)$$

20

(d)

One mole of CO_2 contains 6.02×10^{23} atoms of carbon and 6.023×10^{23} molecules of oxygen.

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	C	D	A	D	D	A	A	B	B	C
A										
Q.	11	12	13	14	15	16	17	18	19	20
A.	C	A	B	D	A	C	B	A	D	D

P **E**