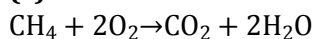


Topic :- SOME BASIC CONCEPTS OF CHEMISTRY

1

(c)



The heat of combustion of 10 g CH₄

$$= -560 \text{ kJ}$$

So, the heat of combustion of 16 g CH₄

$$\begin{aligned} &= \frac{-560}{10} \times 16 \\ &= -896 \text{ kJ/mol} \end{aligned}$$

2

(b)

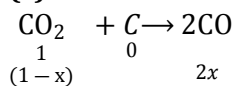
Meq. of H₂SO₄ = Meq. of NaOH

$$0.1 \times 2 \times V = 50 \times 0.2 \times 1$$

$$\therefore V = 50 \text{ mL}$$

3

(c)



$$\therefore 1 - x + 2x = 1.4 \text{ find } x.$$

4

(b)

Follow definition of equivalent weight.

5

(b)

In first oxide,

Mass of arsenic = 65.2

Mass of oxygen = 34.8

$$\therefore \text{Eq. mass of arsenic} = \frac{65.2}{34.8} \times 8 = 14.99$$

In second oxide,

Mass of arsenic = 75.7 g

Mass of oxygen = 24.3 g

$$\therefore \text{Eq. mass of arsenic} = \frac{75.7}{24.3} \times 8 = 24.92$$

Eq. mass of arsenic : Eq. mass of arsenic

(oxide I)

(oxide II)

$$14.99 : 24.92$$

Or 3 : 5

6

(a)

Meq. of metal = Meq. of oxygen

$$\frac{60}{E} = \frac{40}{8}$$

$$\therefore E = 12$$

Now, Meq. of metal = Meq. of bromide

$$\frac{100-a}{12} = \frac{a}{80}$$

$$\therefore a \approx 87\%$$

7

(a)

Meq. of oxalic acid = Meq. of NaOH

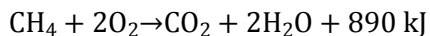
$$\frac{6.3}{63} \times \frac{1000}{250} \times 10 = 0.1 \times V$$

$$\therefore V = 40 \text{ mL}$$

8

(d)

The combustion of methane can be represented by the following equation



16 g

\therefore 16 g CH_4 burns in air to liberate = 890 kJ of heat

$$\therefore 3.2 \text{ g } \text{CH}_4 \text{ will liberate} = \frac{890 \times 3.2}{16}$$

= 178 kJ of heat

10

(a)

1.12 litre $\text{H}_2 \equiv 1.2 \text{ g}$

\therefore 11.2 litre $\text{H}_2 = 12 \text{ g}$

11

(a)

Amount of H_2O_2 in 1 mL. = $\frac{34}{1120} \text{ g}$

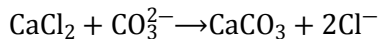
Also, 34 g H_2O_2 gives 16 g O_2 of 11.2 litre O_2 at STP

$$\therefore \frac{34}{1120} \text{ g } \text{H}_2\text{O}_2 = \frac{11.2 \times 34}{1120 \times 34} \text{ litre } \text{O}_2$$

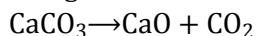
$$= \frac{1}{100} \text{ litre } \text{O}_2 = 10 \text{ mL } \text{O}_2$$

12

(c)



111 g 100g



100 g 56g

\therefore 56 g CaO is obtained by decomposition of

$\text{CaCO}_3 = 100 \text{ g}$

\therefore 0.959 g CaO will be obtained by the decomposition of

$$\text{CaCO}_3 = \frac{100 \times 0.959}{56}$$

= 1.71g

Further,

100 g $\text{CaCO}_3 \equiv 111 \text{ g } \text{CaCl}_2$

$$1.71 \text{ g CaCO}_3 = \frac{111 \times 1.71}{100}$$

$$= 1.89 \text{ g CaCl}_2$$

$$\% \text{ of CaCl}_2 \text{ in the mixture} = \frac{1.89}{4.22} \times 100$$

$$= 44.78$$

$$= 45\%$$

13 **(d)**

1 mole $\text{NH}_3 \equiv 10 \text{ N electron}$

$$\frac{11.2}{22.4} \text{ mole NH}_3 \equiv 10 \times N \times \frac{1}{2} = 3.01 \times 10^{24} \text{ electron}$$

14 **(a)**

$$\text{Number of atoms in } N_2 = \frac{11.2 \times 10^{-3} \times 6.023 \times 10^{23} \times 2}{22.4}$$

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

$$\text{Number of atoms in NO} = \frac{0.015 \times 2 \times 6.023 \times 10^{23}}{30}$$

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

15 **(a)**

For poly atomic molecules, mol. wt. = at. wt. \times atomicity .

16 **(a)**

$$\text{(a) Density of water} = 1 \text{ g cm}^{-3}$$

$$\text{Mass of water} = 1 \text{ m}^3 = 10^6 \text{ cm}^{-3}$$

$$\text{Mass} = \text{volume} \times \text{density}$$

$$= 10^6 \text{ cm}^{-3} \times 1 \text{ g cm}^{-3}$$

$$= 10^6$$

$$= \frac{10^6}{10^3} \text{ kg}$$

$$= 1000 \text{ kg}$$

$$\text{(b) Mass of normal adult man} = 65 \text{ kg}$$

$$\text{(c) Density of Hg} = 13.6 \text{ g cm}^{-3}$$

$$\text{Volume of Hg} = 10 \text{ L} = 10 \times 1000 \text{ cm}^{-3}$$

$$\therefore \text{Mass of Hg} = 13.6 \times 10 \times 1000$$

$$= 136000 \text{ g}$$

$$= 13.6 \text{ kg}$$

$$\therefore \text{Mass of } 1 \text{ m}^3 \text{ water is highest.}$$

17

(c)

Equivalent weight of metal

$$= \frac{\text{wt. of metal}}{\text{wt. of chlorine}} \times 35.5$$

$$= \frac{(74.5 - 35.5) \times 35.5}{35.5} = 39$$

18

(c)

Element	%	% At. wt.	Ratio
N	30.5	30.5/14=2.18	1
O	69.5	69.5/16=4.34	2

Empirical formula= NO_2

Empirical formula weight=46

$$n = \frac{92}{46} = 2$$

 \therefore Molecular formula= $(\text{NO}_2)_2 = \text{N}_2\text{O}_4$

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

P E