Mole Concept Questions for NEET

1. 2.4 g of pure Mg (at. mass = 24) is dropped in 100 mL of 1M HCl. Which of the following statement is wrong?

   (A)1.12 L of hydrogen is produced at S.T.P.

   (B)0.01 mol of magnesium is left behind

   (C)HCl is the limiting reagent.

   (D)None of these

Answer: [A]

800 g of solution has X = 320 g

Solvent in solution =800−230=480g

X left after cooling =320−100=220g

Total weight of solution =480+220=700g

2. In the reaction $3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$, what is the equivalent weight of HNO_3? if molecular weight of HNO_3 is M

   (A)M (B) $\frac{M}{3}$ (C) $\frac{3}{4}M$ (D) $\frac{4}{3}M$

Answer:[D]

$NO_3^- \rightarrow NO$

$N^{+5} \rightarrow N^{+2}$ change $= 3$

$N^{+5} \rightarrow 2 \times N^{+2}$ total change $= 6$

n factor of per mole $HNO_3 = \frac{6}{8} = \frac{3}{4}$

3. A mixture of H2and l2(vapour) in molecular proportion 2 : 3 was heated at 440°Ctill the reaction

$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

reached equilibrium state. Calculate the percentage of I2 converted into HI. (Kcat440°Cis 0.02 and x is small compared to unity) (A) 10%

(C) 20%

(B) 5.77%

Answer:[B]

(D) 8.3%

$H_2(g)$	$I_2(g)$	$2HI(g)$
$2a-x$	$3a-x$	$2x$

$$\frac{(2x)^2}{(2a)(3a)} = 0.02 \Rightarrow \frac{x}{a} = 1.73 \times 10^{-1}$$

$$\% \text{ of } I_2 \text{reacted} = \frac{x}{3a} \times 100 = 5.77\%$$

4. At 100°Cand 1 atm, if the density of liquid water is 1gcm–3 and that of water vapour is 0.0006 0.0006gcm–3,then the volume occupied by water molecules in 1 litre of steam at that temperature is

(A) 6cm3 (B) 60cm3

(C) 0.6cm3 (D) 0.06cm3

Answer:[C]

Vol. of steam =1It=103cm3

$\therefore$ m = d.V

$\therefore$ mass of 103cm3steam =density×volume

$= \frac{0.0006\ gm}{cm^3} \times 103cm3 = 0.6gm$

Actual vol. occupied by H2Omolecules is equal to vol. of water of same mass

$\therefore$ Actual vol. of H 2Omolecules in 6 g steam

= Mass of steam/density of H2O

=0.6g/1g/cm3=0.6cm3

5. A carbon compound containing carbon and oxygen has approximate molar mass equal to 290. On analysis it is found to contain 50%by mass of each element. Therefore molecular formula of the compound is

(A) $C_{12}O_9$ (B) C_4O_3

(C) C_3O_4 (D) C_9O_{12}

Answer:[A]

Element : C O

Y by mass : 50 50

ratio by no. of atoms : $\frac{50}{12}$ $\frac{50}{16}$

Simplest ratio by no of atoms : 4 3

∴ emperical formula = C_4O_3

And let m.f is $(C_4O_3)_n$

∴ 96n=290

or n= $\frac{290}{96} \approx 3$

∴ molecular formulais $C_{12}O_9$

6. If 0.5 moles of $BaCl_2$is mixed with 0.2 moles of $Na_3PO_4$the maximum moles of $Ba_3(PO_4)_2$obtained is

(A) 0.2 (B) 0.5

(C) 0.3 (D) 0.1

Answer:[D]

$3BaCl_2 + 2Na_3PO_4 \rightarrow Ba_3(PO_4)_2 + 6NaCl$

The limiting reactant is Na_3PO_4 the no. of moles of $Ba_3(PO_4)_2$ produced $= \frac{0.2}{2} = 0.1 mole$

7. For the reaction: $Fe_2S_3 \rightarrow FeSO_4 + SO_2$ The equivalent mass of Fe_2S_3 is (M is the mol wt of Fe_2S_3)

(A) $\frac{M}{4}$ (B) $\frac{M}{16}$

(C) $\frac{M}{22}$ (D) $\frac{M}{20}$

Answer:[D]

$Fe_2S_3 + 5O_2 \rightarrow 2FeSO_4 + SO_2$
$Mgm \quad 5\times32gm$

$5\times32gm$ O combines with 8 M gm Fe_2S_3

8 gm O combines with $\frac{M\times8}{5\times32} = \frac{M}{20}$ gm Fe_2S_3

8. The mass of Mg_3N_2 produced if 48 g of Mg metal is reacted with 34g NH_3 as is

$3Mg + 2NH_3 \rightarrow Mg_3N_2 + 3H_2$

(A) $\frac{200}{3}$ (B) $\frac{100}{3}$

(C) $\frac{400}{3}$ (D) $\frac{150}{3}$

Answer:[A]

$3Mg + 2NH_3 \xrightarrow{\Delta} Mg_3N_2 + 3H_2$

mole $\frac{48}{24} = 2$ $\frac{34}{17} = 2$

$\therefore$ Mass of $Mg_3N_2 = \frac{1}{3} \times 2 \times (3 \times 24 + 28) = \frac{200}{3}$

9. 0.078 g of hydrocarbon occupy 22.4 ml of volume at 1 atm and 0°C.The empirical formula of the hydrocarbon is CH. The molecular formula is

(A) C_2H_2 (B) C_4H_4

(C) C_6H_6 (D) C_8H_8

Answer:[C]

$\frac{w}{M} = \frac{1 \times 22.4 \times 10^{-3}}{22.4}$ M=78g

$n = \frac{78}{13} = 6$

$\therefore$ MF= $(CH)_6$ or C_6H_6

10. For 118%labelled oleum if the no. of moles of H_2SO_4 and free SO_3 be x & y respectively, the values approximately of $\frac{x+y}{x-y}$ is

(A) −1.21 (B) −1.51

(C) 1.51 (D) 1.21

Answer: [B]

118%Oleum

18 g water = 1 mole water

1mole SO_3 = 80g SO_3

$\therefore$ y = 1

$\therefore$ nH_{2SO_4} in oleum(x) = 20 / 98

$\therefore \frac{x+y}{x-y} = \frac{1+\frac{20}{98}}{\frac{20}{98}-1} = -1.51$

11. The average atomic mass of a mixture containing 79 mole % of 24Mgremaining 21 mole % of 25Mgand 26Mgis 24.31 %. Mole of 26Mgis

(A) 5 (B) 20

(C) 10 (D) 15

Answer:[C]

Let % mole of ^{26}Mg be X

$$\frac{(21-X)25 + 26x + 79 \times 24}{100} = 24.31$$

X=10%

12. 20 ml of a H_3PO_4solution needs 40 ml of 0.1 M NaOH to convert it into sodium dihydrogen phosphate. How much volume of 0.1 M $Ca(OH)_2$ is needed to neutralise the same volume of same H_3PO_4completely

(A) 120 ml (B) 20 ml

(C) 40 ml (D) 60 ml

Answer: [D]

Equivalents of H_3PO_4 =equivalents of NaOH

$20 \times 10^{-3} \times M \times 1 = 40 \times 0.1 \times 10^{-3}$

M = 0.2

Equivalents of $Ca(OH)_2$ = equivalents of H_3PO_4

$V \times 2 \times 0.1 \times 10^{-3} = 3 \times 0.2 \times 10^{-3} \times 20$

V = 60 ml

13. $NH_3$is produced according to the following reaction :

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$.In an experiment 0.25 mol of $NH_3$is

formed when 0.5 mol of N_2 is reacted with 0.5 mol of H_2. What is % yield?

(A) 75% (B) 50%

(C) 33% (D) 25%

Answer:[A]

$$\%\text{yield} = \frac{\text{Produced mol of } NH_3 \times 100}{\text{max .possible produced mole of } NH_3} = \frac{0.25}{0.5\ 2\times} \times 100 = 75\%$$
$$3$$

14. Which sample contains the largest number of atoms

(A) 1 mg of C4H10 (B) 1 mg of N2

(C) 1 mg of Na (D) 1 mL of water

Answer: [D]

$$1\text{mg } C_4H_{10} = \frac{14N}{58} \times 10^{-3} \text{ atom s}$$

$$1\text{mg } N_2 = \frac{2N \times 10-3}{23} \text{ atoms}$$

$$1\text{mg Na} = \frac{N \times 10-3}{23} \text{ atom s}$$

$$1\text{m } H_2O = 1\text{g } H_2O = \frac{3N}{18} \text{ atom s}$$

15. The pair of species having same percentage of carbon is

(A) CH_3COOH and $C_6H_{12}O_6$ (B) CH_3COOH and C_2H_5OH

(C) $HCOOCH_3$ and $C_{12}H_{22}O_{11}$ (D) $C_6H_{12}O_6$ and $C_{12}H_{22}O_{11}$

Answer: [A]

Both have same empirical formula CH_2O so same percentage.

$V.D. = \frac{Mol.wt}{2} = 120$

16. Excess of aluminium is burn in the gaseous product (aluminium oxide) after thermal decomposition of potassium chlorate. If 2 moles of potassium chlorate is thermally decomposed then how many moles of aluminium oxide will form?

(A) 2.5 (B) 2 (C) 3 (D) 1.5

Answer: [B]

$2KClO_3 \rightarrow 2KCl + 3O_2$

3/2 moles of O_2 is formed by thermal decomposition of one mole of $KClO_3$, thus 3 moles of O_2 is formed by thermal decomposition of 2 moles of $KClO_3$.

$4Al+3O_2 \rightarrow 2Al_2O_3$.

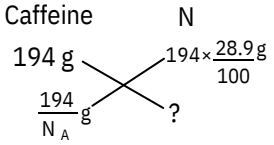
2 moles of Aluminium oxide is formed with 3 moles of O2. So, to form 2 moles of Aluminium oxide, 2 moles potassium chlorate is thermally decomposed.

17. Caffeine has a molecular mass of 194. If it contains 28.9% by mass of nitrogen, number of atoms of nitrogen in one molecule of caffeine is

(A) 4 (B) 6

(C) 2 (D) 3

Answer: [A]



$$=\frac{28.9}{100}\times\frac{194}{NA}\text{g}$$

$$=\frac{0.289\times194}{NA}\times\frac{1}{14}\times NA \text{ atoms} = 4$$

18. What will be the normality of a solution obtained by mixing 0.45 N and 0.60 N NaOH in the ratio 2: 1 by volume?

(A) 0.4 N (B) 0.5 N

(C) 1.05 N (D) 0.15 N

Answer:[B]

$$N \; N = \frac{1V1 + N2V2}{V1 + V2} = \frac{0.45 \times 2 + 0.6 \times 1}{2+1} = \frac{1.5}{3} = 0.5N$$

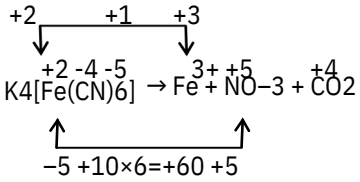
19. The equivalent weight of K4 [Fe(CN)6] in the given reaction is

$$K_4[Fe(CN)_6] \xrightarrow{[O]} Fe^{3+} + NO_3^- + CO_2$$

(A) M/20 (B) M/1

(C) M/60 (D) M/61

Answer:[D]



Net change in oxidn no. = + 60 + 1 = + 61

$$\text{Eq. wt.} = \frac{M}{61}$$

20. 105 ml of pure water at 4°Cis saturated with NH3(g) producing a solution of density 0.9 gm/ml. If this solution contain 30%of NH3by mass, therefore the total volume of solution is

(A) 250 ml (B) 125 ml

(C) 166.67 ml (D) 111.11 ml

Answer: [C]

Let. final vol. of solution is V ml

$\therefore$ wt of soln $= V \times 0.9$ gm and wt of NH3

$= (V \times 0.9 - 105)$gm

$\therefore \; V \times 0.9 - 105 = V \times 0.9 \times 0.3$

$\therefore \; V \times 0.9 \times 0.7 = 105$

or $V = \frac{105}{0.9 \times 0.7} = \frac{105}{0.63}$ ml $= 166.67$ml

21. The solubility of substance “X” in pure ethanol is 0.1 gm/lit and in water is 0.01 gm/lit.

To dissolve 11 gm of dry “X” we are adding 20 ml of fresh 50% (V/V) ethanol solution in each time on “X”. How many times we are to add this ethanol solution to dissolve “X”?

(A) 100 (B) 106

(C) 103 (D) 104

Answer:[D]

In each time we are adding 20 ml ethanol solution.

In 20 ml ethanol solution vol. C2H5OH=10mland vol of water = 10 ml

In 10 ml ethanol mass of “X” dissolved $= \frac{0.1}{1000} \times 10gm$

In 10 ml water mass of “X” dissolved $= \frac{0.1}{1000} \times 10gm$

In each time, total mass of “X” dissolved $= \frac{1.1}{1000} gm$

$\therefore$ No. of times of addition of ethanol solution $11 = \frac{}{1.1} \times 1000 = 104$

22. A mixture of CH4and C2H2occupied a certain volume at a total pressure equal to 63 torr. The same gas mixture was burnt to CO2and H2O(□).The CO2(g)alone was collected in the same volume and at the same temperature, the pressure was found to be 69 torr.

What was the mole fraction of CH4in the original gas mixture?

(A) $\frac{19}{21}$ (B) $\frac{19}{20}$

(C) $\frac{17}{18}$ (D) $\frac{15}{16}$

Answer:[A]

Let no. of moles of CH_4 present = n1 mol.

Let no. of moles of C_2H_2 present = n2 mol.

$\therefore$ $(n1 + n2) = 63K$ ...(1)

$CH_4 + 2O_2 \rightarrow CO_2(g) + 2H_2O(\ell)$

n1 mol $\rightarrow$ n1 mol

$C_2H_2 + 3O_2 \rightarrow 2CO_2(g) + H_2O(\ell)$

n2 mol $\rightarrow$ 2n2 mol.

$\therefore$ After combustion total no. of moles

$= (n1 + 2n2) = 69K$ ...(2)

$\therefore$ $n_2 = 6K$ and $n1 = 57K$

$\therefore$ Mole fraction of CH_4 in the original gas mix = $\frac{57K}{63K} = \frac{19}{21}$

23. 12 g carbon combines with 64 g sulphur to form CS2.12 g carbon also combines with 32 g oxygen to form CO2.10 g sulphur combines with 10 g oxygen to form SO2.These data illustrate the

(A) Law of multiple proportions

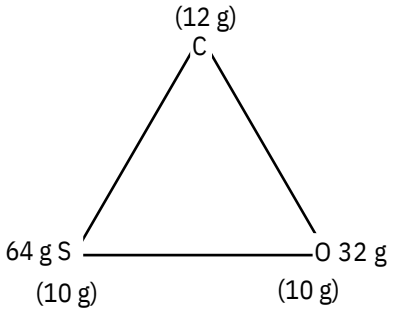
(B) Law of definite proportions

(C) Law of reciprocal proportions

(D) Law of gaseous volumes

Answer:[C]

Ratio of the weights of S and O combining with fixed weight of C is 64: 32 = 2: 1. Ratio of the weights of S and O combining directly = 10: 10 = 1: 1. The two ratios are simple multiple of each other.
This proves law of reciprocal proportions.



24. The weight of 305 mL of a diatomic gas at $0^{\circ}C$ and 2 atm pressure is 1 g. The weight of one atom is

(N is the Av. no.) :

(A) 16/N (B) 32/N

(C) 16 N (D) 32 N

Answer: [A]

Calculate $M = \frac{RTw}{PV}$

Wt. of one atom = $M/(N \times 2)$

25. 10 mL of hydrogen contains 2×103molecules of hydrogen at certain pressure and temperature. Calculate the number of molecules of oxygen whose volume is 200 mL at the same temperature and pressure

(A) 2×104molecules (B) 4×104molecules

(C) 4×102molecules (D) None of these

Answer: [B]

At the same temperature and pressure equal volume of the gas contain equal number of molecules.

Hence, 10 ml of H_2or O_2=2X10^{3}number of molecules

200 ml of H_2or O_2 =(2X10/10)200

4X104number of molecules

26. What is the empirical formula of a compound composed of O and Mn in equal weight ratio?[Mn = 55]

(A) MnO (B) MnO_2

(C) Mn_2O_3 (D) Mn_2O_7

Answer:[D]

Mn_2O_7

mass of $Mn = 55 \times 2 = 110$

Mass of $O = 16 \times 7 = 112$

27. The number of moles of CrO_7^{2-} needed to oxidise 0.136 equivalents of $N_2H_5^+$ by the reaction: $N_2H_5^+ + CrO_7^{2-} \rightarrow N_2 + Cr^{3+} + H_2O$ is

(a) 0.136 (b) 0.272

(c) 0.816 (d) 0.0227

Answer: [d]

'n' factor of CrO_7^{2-} is 6.

Equivalents of CrO_7^{2-} needed = equivalents of $N_2H_5^+$ = 0.136

$\therefore$ Mole of $Cr_2O_7^{2-} = \frac{0.136}{6} = 0.0227$

28. Ethanol C2H5OH,is the substance commonly called "alcohol". The density of liquid ethanol is 0.7893gml–1at 20°C.If 1.2 mol of ethanol are needed for a particular experiment, what volume of ethanol should be measured out?

(a) 55 ml (b) 58 ml

(c) 70 ml (d) 79 ml

Answer: [c]

Mass of ethanol needed =1.2×46=55.2

Volume of ethanol measured out $= \frac{\text{Mass of ethanol}}{\text{Density of ethanol}} = \frac{55.2}{0.7893} = 70\text{ml}$

29. 2 litre carbogen (at S.T.P.) is passed through a solution of lime water to get 0.5 g white precipitate. The percentage of carbon dioxide gas in carbogen by volume is

(a) 8 (b) 11.2

(c) 5.6 (d) 22.4

Answer: [c]

$$Ca(OH)_2 + CO_2 \rightarrow \underset{0.5g}{CaCO_3} + H_2O$$

∴ No. of moles of CO2in 2 lit carbogen $= \frac{5}{1000}$

∴ %of COin carbogen by vol $= \frac{\frac{5}{1000} \times 22.4}{2} \times 100 = 5.6$

30. 1000 ml of oxygen at STP were passed through an ozoniser and the resulting volume was 888 ml at STP. This quantity of ozonised oxygen is passed through excess of KI solution. The weight of l2liberated is

(a) 25.4 g (b) 12.7 g
(c) 2.54 g (d) 1.27 g
Answer: [c]

In ozoniser, O2is converted to O3and transformation is never 100%.

$$\underset{1000-3x}{3O_2} \rightarrow \underset{2x}{2O_3}$$

Where 3xis the volume of O2converted to O3.

$\therefore 1000-3x+2x=888$

$\therefore x=112ml$

$\therefore$ Volume of O_3 at STP = 224 ml

Moles of $O_3 = \frac{224}{22400} = 0.01$

$O_3+2KI+H_2O \rightarrow 2KOH+I_2+O_2$

$\therefore$ Moles of $I_2 = 0.01$

$\therefore$ Weight of I_2 liberated $= 0.01 \times 254 = 2.54g$

31. The average molecular wt of a mixture of gas containing nitrogen and carbon dioxide is 36. The mixture contain 280

gm of nitrogen, therefore, the amount of CO_2 present in the mixture is

(A) 440 gm (B) 44 gm

(C) 0.1 mole (D) 880 gm

Answer: [A]

The amount of CO_2 present in the mixture is 440 gm.

32. In a reaction FeS_2 is oxidised by O_2 to Fe_2O_3 and SO_2. If the equivalent of O_2 O_2 consumed is y, then the equivalents of Fe_2O_3 and SO_2 with respect to FeS_2 are

(a) y and y (b) $\frac{y}{2}$ and y

(c) $\frac{y}{11}$ and $\frac{10}{11}y$ (d) $\frac{10}{11}y$ and $\frac{y}{11}$

Answer: [c]

$$\overset{+2\ -1}{2FeS_2}\ +\ 11/2O_2 \rightarrow \underset{(n=2)}{\overset{+3}{Fe_2O_3}}\ +\ \underset{(n=5)}{\overset{+4}{4SO_2}}$$
$$(n=11)$$

Equivalents of O_2 = Equivalents of $FeS_2 = y$

Moles of $FeS_2 = \frac{y}{11}$

Moles of $Fe_2O_3 = \frac{y}{2\times 11}$

$\therefore$ Equivalents of $Fe_2O_3 = \frac{y\times 2}{2\times 11} = \frac{y}{11}$

Moles of $SO_2 = \frac{2y}{11}$

$\therefore$ Equivalents of $SO_2 = \frac{2y \times 5}{11} = \frac{10y}{11}$

33. One mole of a mixture of CO and CO_2 requires exactly 20 grams of NaOH to convert all the CO_2 into Na_2CO_3. How many more grams of NaOH would it require for conversion into Na_2CO_3 if the mixture (one mole) is completely oxidised to CO_2.

(a) 60 g (b) 80 g

(c) 40 g (d) 20 g

Answer: [a]

$2NaOH + CO_2 \rightarrow Na_2CO_3 + H_2O$

Moles of NaOH $20 = \frac{1}{2}$

$\therefore$ Moles of CO $= \frac{1}{2} \times 1 = \frac{1}{2}$

$\therefore$ Moles of CO $1 - \frac{1}{2} = \frac{1}{2}$

$CO + \frac{1}{2} O_2 \rightarrow CO_2$

Moles of CO_2 produced $= \frac{3}{4}$ from CO

Moles of NaOH extra $= \frac{3}{4} \times 2 = \frac{3}{2}$

Mass of NaOH extra $3 = \frac{}{2} \times 40 = 60g$

34. The equivalent weight of iron in Fe_2O_3 would be

(A) 18.6 (B) 28

(C) 56 (D) 112

Answer: [A]

In Fe_2O_3, $2 \times 56 = 112$ parts of Fe combines with 48 parts of oxygen. Hence 8 parts of oxygen will combine with

$$Fe = \frac{112}{6} = 18.6$$

35. When 3.0 litre solution of normality N is mixed with 5.0 litre of 4M HCl, then the resultant solution has the normality 10. Find the value of N.

(A) 10 (B) 20 (C) 15

(D) 25

Answer: [B]

As we know,

$N_1V_1 + N_2V_2 = NV$

Normality of 4M HCl solution will be equal to 4N.

Given, $N_1, N_2 = N$, 4N and $V_1, V_2 = 3.0$ and 5.0 L respectively.

Normality of resultant solution = 10 and final volume = 3.0 L + 5.0 L = 8 L

$\Rightarrow N \times 3.0 + 4 \times 5.0 = 10 \times 8$

$\Rightarrow 3N + 20 = 80$

$3N = 60$

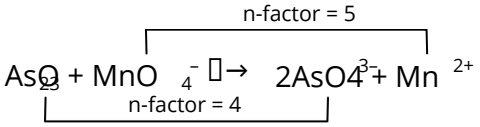
$N = \frac{60}{3} = 20$

36. A 0.1097 gm sample of As_2O_3 required 26.10 mL of $KMnO_4$ solution for its titration. The molarity of $KMnO_4$ solution is

(A) 0.02 (B) 0.04

(C) 0.018 (D) 0.3

Answer: [C]



$$As_2O_3 + MnO_4^- \rightarrow 2AsO_4^{3-} + Mn^{2+}$$

Let molarity of $KMnO_4$ solution be M

$\therefore$ Eq. of As_2O_3 = Eq. of $KMnO_4$ solution

$$\frac{0.1097}{198} \times 4 = \frac{26.10 \times M \times 5}{1000} \quad \left(\text{Equivalent weight } As_2O_3 = \frac{198}{4}\right)$$

Molarity = $0.017M \approx 0.018$

37. 112 ml of a gas is produced at STP by the action of 0.412 gm of ROH alcohol with CH_3MgI. Molecular mass of alcohol is:

(A) 32g (B) 41.2g

(C) 82.4g (D) 156g

Answer: [C]

$$\underset{1 mole}{ROH} + CH_3MgI \rightarrow \underset{1 mole}{CH_4} + MgI(OR)$$

So gas produced is CH_4

$$n_{CH_4} = \frac{112}{22400} = n_{ROH} = \frac{wROH}{MWKOH}$$

$$MW = 0.412 \times \frac{22400}{112} = 82.4g$$

38. 12 gm of Mg (At mass = 24) will react with an acid to give

(A) one mole of H_2 (B) one mole of O_2

(C) half moles of H_2 (D) half mole of O_2

Answer: [C]

$Mg + 2H^+ \rightarrow Mg^{++} + H_2$

24g 1 mole

$\therefore$ 12g of Mg gives half mole of H_2.

39. When pentane C_5H_{12}, is burned in excess oxygen, the products of the reaction are $CO_2(g)$ and $H_2O(l)$. In the balanced equation for this combustion

$C_5H_{12}(g) + \_\_\_\_ O_2(g) \rightarrow 5CO_2(g) + 6H_2O(l)$ the coefficient of oxygen should be

(a) 16 (b) 12

(c) 11 (d) 8

Answer: [d]

Using the POAC method, the balanced equation will be

$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O$

$\therefore$ Coefficient of oxygen is 8.

40. The volume of 0.25 M H_3PO_3 required to neutralise 25 ml of 0.03M $Ca(OH)_2$ is

(A) 1.32 mL (B) 3 mL

(C) 26.4 mL (D) 2.0 mL

Answer: [B]

Meq. of H_3PO_3 = Meq. of $Ca(OH)_2$

$\Rightarrow V \times 0.25 \times 2 = 25 \times 0.03 \times 2$ (H_3PO_3 is diabasic acid)

$\therefore \quad V = \frac{25 \times 3 \times 2}{25 \times 2} = 3mL$

41. When 16.6 g of KI is treated with excess of KIO3in presence of 6N HCl, ICl is produced. The amount of KIO3consumed and the ICl formed are

(a) 0.1 mol and 0.3 mol (b) 0.05 mol and 0.3 mol

(c) 0.05 mol and 0.15 mol (d) 0.1 mol and 0.15 mol

Answer: [c]

$2KI^{-1} + KI^{+5}O_3 \square\square HCl \square\square 3ICl^{+1}$

n=2 n = 4

$\frac{16.6}{166} = 0$ 10.05 0.15

42. No. of moles in 11.2 L of CO_2at NTP is

(A) 0.5 (B) 0.3

(C) 0.2 (D) 0.1

Answer: [A]

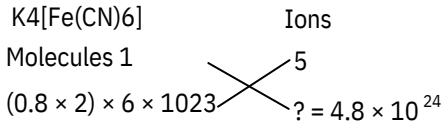
$n = \frac{11.2}{22.4} = 0.5$

43. The number of ions present in 2.0 L of a solution of 0.8MK4[Fe(CN)6]is

(A) 4.8×1022(B) 4.8×1024

(C) 9.6×1024(D) 9.6×1022

Answer: [B]



44. Assuming full decomposition, the volume of CO2released at STP on heating 9.85 g of BaCO3(Atomic mass of Ba = 137) will be

(A) 0.84 L (B) 2.24 L

(C) 4.06 L (D) 1.12 L

Answer: [D]

$BaCO_3 \rightarrow BaO + CO_2\uparrow$

Molecular weight of $BaCO_3 = 137 + 12 + 3516 = 197$

97 gm $BaCO_3$produces 22.4 L CO_2(g)at S.T.P.

$\therefore$ 9.85 gm produces $\frac{22.4 \times 9.85}{197} = 1.12$Lat S.T.P.

45. If 30 mL of H2and 20 mL of O2react to form water, what is left at the end of the reaction?

(A) 10mLofH2 (B) 5mLofH2

(C) 10mLofO2 (D) 5mLofO2

Answer: [D]

$2H_2 + O_2 \rightarrow 2H_2O$

Combining volume ratio of H2and O2=2:1

Here H2is limiting reactant. 30 ml of H2will react with 15 ml of O2and 5 ml of O2will remain unreacted at the end.