

36. The weight of the molecule of a compound $C_{60}H_{122}$ is
 a) 1.30×10^{-20} g b) 5.01×10^{-21} g c) 3.72×10^{23} d) 1.4×10^{-21} g
37. How much time (in hours) would it take to distribute one Avogadro number of wheat grains if 10^{20} grains are distributed each second?
 a) 0.1673 b) 1.673 c) 16.73 d) 167.3
38. A person adds 1.71 gram of sugar ($C_{12}H_{22}O_{11}$) in order to sweeten his tea. The number of carbon atoms added are (mol. Mass of sugar = 342)
 a) 3.6×10^{22} b) 7.2×10^{21} c) 0.05 d) 6.6×10^{22}
39. From 392 mg of H_2SO_4 , 1.204×10^{21} molecules are removed. The moles of H_2SO_4 left is
 a) 2.0×10^{-3} b) 1.2×10^{-3} c) 4.0×10^{-3} d) 1.5×10^{-3}
40. Which of the following pairs have the same number of atoms?
 (a) 16 g of O_2 (g) and 4 g of H_2 (g) (b) 16 g of O_2 and 44 g of CO_2
 (c) 28 g of N_2 (g) and 32 g of O_2 (d) All
41. A bivalent metal has an equivalent mass of 32. The molecular mass of the metal nitrate is
 (a) 168 (b) 192 (c) 188 (d) 182
42. The moles of O_2 required for reacting with 6.8 g ammonia ($\dots NH_3 + \dots O_2 + \rightarrow \dots NO + \dots H_2O$) is
 (a) 5 (b) 2.5 (c) 1 (d) 0.5
43. If the density of methanol is 0.793 kg L^{-1} , what is its volume needed for making 2.5 L of its 0.25M solution?
 (a) 5 mL (b) 25.2 ml (c) 50 ml (d) 2.52 ml
44. The equivalent weight of a metal is 4.5 and the molecular weight of its chloride is 80. The atomic weight of the metal is
 a) 18 b) 9 c) 4.5 d) 36
45. 1.575 g of a dibasic acid is neutralized by 25mL of 1M NaOH solution. Hence molar mass of dibasic acid is
 a) 126 gmol^{-1} b) 63 g mol^{-1} c) 12.6 g mol^{-1} d) 1.26 g mol^{-1}
46. The average molar mass of a mixture of methane and ethene present in the ratio a : b is found to be 20.0 g mol^{-1} . If the ratio were reversed, the molar mass of the mixture would be
47. 13.5g of Aluminium when changes to Al^{+3} ion in solution, will haveelectrons
 a) 9.033×10^{23} b) 6.033×10^{23} c) 9.033×10^{22} d) 6.033×10^{22}
48. A gaseous mixture contains CH_4 and C_2H_6 in equimolecular proportion. The weight of 2.24 litres of this mixture at NTP is :
 a) 4.6 g b) 1.6 g c) 2.3 g d) 23 g
49. 81.4 g sample of ethyl alcohol contains 0.002 g of water. The amount of pure ethyl alcohol (to the proper number of significant figures) is :
 a) 81.398 g b) 81.40 g c) 81.4 g d) 81 g
50. One gram of a chloride was found to contain 0.835 g of chlorine. Its vapour density is 85. Molecular formula of the compound is
 a) MCl_3 b) MCl_2 c) MCl_3 d) MCl

solution:

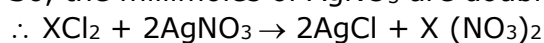
1.Ans: (c)

Millimoles of solution of chloride = $0.05 \times 10 = 0.5$

Millimoles of AgNO_3 solution

$$= 10 \times 0.1 = 1$$

So, the millimoles of AgNO_3 are double than the chloride solution.



2.Ans: (d)

Writing the equation for the reaction, we get



$$207+16 \quad 2 \times 36.5 \quad 207 + 71$$

$$= 223 \text{ g} = 73 \text{ g} \quad = 278 \text{ g}$$

From this equation we find 223 g of PbO reacts with 73 g of HCl to form 278 g of PbCl_2 . If we carry out the reaction between 3.2 g HCl and 6.5 g PbO.

Amount of PbO that reacts with 3.2 g HCl

$$= \frac{223}{73} \times 3.2 = 9.77 \text{ g}$$

Since amount of PbO present is only 6.5 g so PbO is the limiting reagent.

$$\text{Amount of PbCl}_2 \text{ formed by 6.5 g of PbO} = \frac{278}{223} \times 6.5 \text{ g}$$

Number of moles of PbCl_2 formed

$$= \frac{278}{223} \times \frac{6.5}{278} \text{ moles} = 0.029 \text{ moles}$$

3.Ans:(c)

Ammonium dichromate is $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ 1 mole of it contains 2 moles of N atoms, 8 moles of H atoms, 2 moles of Cr atoms and 7 moles of O-atoms

$$\therefore \text{Total atoms of all elements} = 2 + 8 + 2 + 7$$

$$= 19 \text{ moles}$$

$$= 19 \times 6.023 \times 10^{23} \text{ atoms}$$

$$= 114.437 \times 10^{23}$$

4.Ans(a)

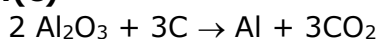
$$\text{Moles of oxalic acid} = \frac{6.022 \times 10^{20}}{6.022 \times 10^{23}} = 10^{-3} \text{ moles}$$

$$\text{Molarity} = \frac{10^{-3}}{500} \times 1000$$

$$= \boxed{2 \times 10^{-3} \text{ M}}$$

$$= \boxed{0.002 \text{ M}}$$

5.Ans:(c)



$$\text{Gram equivalent weight of Al} = \frac{27}{3} = 9$$

$$\text{Equivalent weight of C} = \frac{12}{4} = 3 (\text{C}^0 \rightarrow \text{C}^{+4}\text{O}_2)$$

$$\text{No. of gram equivalent of Al} = \frac{270 \times 10^3}{9}$$

$$= 30 \times 10^3$$

Hence,

No. of gram equivalent of C = 30×10^3

Again,

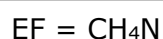
No. of gram equivalent of C

$$= \frac{\text{mass in gram}}{\text{gram equivalent weight}} \Rightarrow 30 \times 10^3 = \frac{\text{mass}}{3}$$

$$\Rightarrow \text{mass} = 90 \times 10^3 \text{ g} = 90 \text{ kg}$$

6. Ans (a)

	Percentage	At mass	Moles	Simple ratio
C	40%	12	$\frac{40}{12} = 3.33$	$\frac{3.33}{3.33} = 1$
H	13.3%	1	$\frac{6.7}{1} = 6.7$	$\frac{13.33}{3.33} = 4$
O	53.3%	16	$\frac{53.3}{16} = 3.33$	$\frac{3.33}{3.33} = 1$



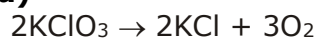
7. Ans: (c)

Mass of oxygen in oxide = $4 - 2.8 = 1.2 \text{ g}$

$$\text{Eq. wt. of metal} = \frac{2.8}{1.2} \times 8 = 18.67$$

$$\text{Valency of metal} = \frac{56}{18.67} = 3$$

Ans(a)

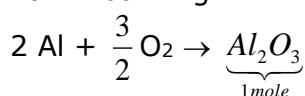


2 moles 3 moles

2 mol of KClO_3 gives = 3 mol O_2

1 mol of KClO_3 gives = $\frac{3}{2}$ mol O_2

For Al burning



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

\therefore 1 mole Al_2O_3 formed.

9. Ans: (c)

Volume of a gas at STP = 22.4 L

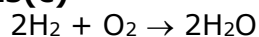


22.4 L $5 \times 22.4 \text{ L}$

\therefore To burn 22.4 L C_3H_8 , the oxygen required = $5 \times 22.4 \text{ L}$

\therefore To burn 1 L C_3H_8 , the oxygen required will be = $\frac{5 \times 22.4}{22.4} = 5 \text{ L}$

10. Ans(c)



4g 32 g 36 g

When 4 g of H₂ reacts with 32 g of O₂ gives 36 g of H₂O

Now present oxygen is 20 g

∴ O₂ will be the limiting reagent and H₂O will be calculated from O₂

∴ 32 g of O₂ given = 36 g of H₂O

$$20 \text{ g of O}_2 \text{ given} = \frac{36}{32} \times 20 = 22.5 \text{ g H}_2\text{O}$$

11.Sol. Answer (d)

This question can be solved by two methods.

Method – I

	Oxide I	Oxide II
X ₃ O ₄	O = 27.6%	O = 30%
	X = 72.4%	X = 70%
	O = 27.6%	X = 70%

72.4% of X = 3 mol of X

$$70\% \text{ of X} = \frac{3}{72.4} \times 70 = 2.90 \text{ mol of X}$$

Similarly

27.6% of O = 4 mol of O

$$30\% \text{ of O} = \frac{4}{27.6} \times 3 = 4.34 \text{ atom of O}$$

$$\begin{array}{l} \text{X} \quad : \quad \text{O} \\ 2.9 \quad : \quad 4.34 \\ \text{i.e.,} \quad 2 \quad : \quad 3 \end{array}$$

Formula will be : X₂O₃

Method – II

Formula of 1st X₃O₄

$$\begin{aligned} \text{Eq. mass of X} &= \frac{\text{wt of X}}{\text{wt of O}} \times 8 \\ &= \frac{72.4}{27.6} \times 8 = 20.9 = 21 \end{aligned}$$

$$\text{Positive charge of X} = 2 \times \frac{4}{3} = \frac{8}{3}$$

$$\therefore \text{Atomic mass of X} = \frac{8}{3} \times 21 = 56 \text{ g}$$

∴ [Atomic mass = eq. mass × Valency]

$$\text{Eq. mass of X} = \frac{70}{30} \times 8 = 18.66$$

Atomic mass of X = 56 g

Calculate from 1st oxide

$$\therefore \text{Valency} = \frac{\text{Atomic mass}}{\text{Eq. mass}} = \frac{56}{18.6} = 3$$

Formula will be: X₂O₃

12.Solution: (a) 28.9% means

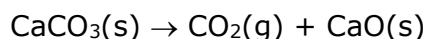
100 g of caffeine has 28.9 g of N

$$194 \text{ g of caffeine has } \frac{28.9}{100} \times 194 \text{ g of N}$$

Let no. of nitrogen atoms be x

$$\Rightarrow x \times 14 = \frac{28.9}{100} \times 194$$

$$\therefore x = 4.$$



13.Solution: (c)

	1 mol	1 mol
	100 g	44 g
	10 kg	4.4 kg
	$\frac{80}{100} \times 10 \text{ kg}$	$4.4 \times \frac{80}{100}$
	= 8 kg	= 3.52 kg

14.Solution: (a)

Element:	C	O
% by mass:	50	50
Ratio by no. of atoms:	$\frac{50}{12}$	$\frac{50}{16}$

Simplest ratio by no of atoms: 4 : 3

∴ Empirical formula = C₄O₃

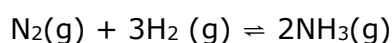
And let molecular formula is (C₄O₃)_n

∴ 96 n = 290

Or n = $\frac{290}{96} = 3$

∴ Molecular formula is C₁₂O₉

15.Ans: (d)



1 L of N₂ reacts with 3 L of H₂ to form 2 L NH₃. Thus, N₂ is limiting reagent. 10 L N₂ will react with 30 L H₂ to form 20 L NH₃. As actual yield is 50% of the expected value, NH₃ formed = 10 L, N₂ reacted = 5 L, H₂ reacted = 15 L.

16. Ans(b)

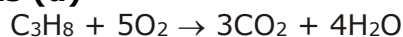
$$\text{Number of } e^- \text{ in 1.6 g of CH}_4 = \frac{1.6}{16} \times \textcircled{10} \times N_0 = N_0$$

↑ [Total number of e⁻ in CH₄]

$$\text{Number of } e^- \text{ in 1.8 g of H}_2\text{O} = \frac{1.8}{18} \times \textcircled{10} \times N_0 = N_0$$

↑ [Total number of e⁻ in CH₄]

17.Ans (d)



For 1 mol propane 5 mol O₂ gas is needed.

22.4 L propane = 5 × 22.4 L of O₂ gas needed

∴ 1 L propane = 5 L of O₂ gas is required

18.Ans(b)

Let V cm³ solution of nitric acid contains 19.9 g dissolved HNO₃ (nitric acid).

Mass of solution = volume × density = (V × 1.41) g

There is 69% HNO₃ by mass in the solution.

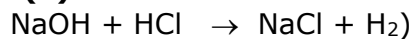
∴ Mass of HNO₃ in (V × 1.41) g of the solution

$$= \frac{69}{100} \times (V \times 1.41)$$

$$\therefore 19.9 = \frac{69}{100} \times (V \times 1.41)$$

$$V = 20.4 \text{ cm}^3$$

19. Ans(a)



$$40 \text{ g} \quad 36.5 \text{ g} \quad 58.5 \text{ g}$$

$$\text{NaOH in 100 mL} = 0.4 \text{ g}$$

$$\text{HCl in 50 mL} = 0.3675 \text{ g}$$

$$\text{NaCl formed} = 0.5 \text{ g}$$

$$58.5 \text{ g NaCl is formed from} = 40 \text{ g NaOH}$$

$$0.5 \text{ g NaCl is formed from} = \frac{40}{58.5} \times 0.5 = 0.342 \text{ g NaOH}$$

$$\text{NaOH unreacted} = 0.4 - 0.342 = 0.058 \text{ g}$$

20. Ans(d)



$$100 \text{ g} \quad 73 \text{ g}$$

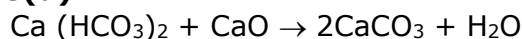
$$10 \text{ g} \quad 7.3 \text{ g}$$

$$(50\% \text{ pure}) 5 \text{ g} \quad \frac{7.3}{2} \text{ g HCl}$$

$$\frac{\text{mass}}{\text{volume}} = \text{density}$$

$$\therefore \text{Volume of HCl} = \frac{\text{mass of HCl}}{\text{density of HCl}} = \frac{7.3}{2 \times 1.825} = 2 \text{ mL}$$

21. Ans(d)



$$56 \text{ g} \quad 2 \times 100 \text{ g}$$

$$0.56 \text{ g CaO} = 2 \text{ g CaCO}_3 \text{ in } 10 \text{ L H}_2\text{O}$$

$$10 \text{ L} (= 10^4 \text{ mL}) \text{ hard water has CaCO}_3 = 2 \text{ g}$$

$$\therefore 10^6 \text{ mL hard water has CaCO}_3 = 200 \text{ g}$$

$$\text{Thus, hardness part per million (in ppm) of CaCO}_3 \text{ is} = 200$$

22. Ans(b)

$$\text{Equivalent weight of the acid} = E$$

$$\text{Normality of NaOH solution} = \frac{W}{E}$$

$$V_1 N_1 = N_2 V_2$$

$$\text{Acid} \quad \text{NaOH}$$

$$100 \times \frac{39}{E} = 95 \times 1$$

$$E = \frac{100 \times 39}{95} = 41.05$$

$$\therefore \text{Basicity of the acid} = \frac{\text{Formula wt.}}{\text{Eq. wt}} = \frac{82}{41.05} = 2$$

23. Ans(b)

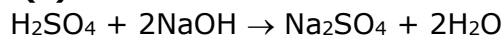
0.24g of metal displaces 112cm³ of hydrogen at STP

$$\text{Mass of the metal displaces } 11200\text{cm}^3 \text{ hydrogen is } \frac{0.24 \times 11200}{112} = 24$$

Equivalent mass is 24

Valency = 2

Atomic mass = 24 × 2 = 48

24. Ans(c)

$$\text{Pure H}_2\text{SO}_4 \text{ required for 1 mole of NaOH} = \frac{1}{2} \text{ mol } 49 \text{ g}$$

$$70\% \text{ H}_2\text{SO}_4 \text{ required for 1 mole of NaOH} = \frac{49 \times 100}{70} = 70 \text{ g}$$

25. Ans(d)

Mass of metal oxide = 3g

Mass of metal chloride = 5g

$$\frac{\text{Mass of metal oxide}}{\text{Mass of metal chloride}} = \frac{\text{Eq. mass of metal} + \text{Eq. mass of oxygen}}{\text{Eq. mass of metal} + \text{Eq. mass of chlorine}}$$

$$\frac{3}{5} = \frac{E + 8}{E + 35.5}$$

$$3(E + 35.46) = 5(E + 8)$$

$$3E + 106.38 = 5E + 40$$

$$106.8 - 40 = 5E - 3E$$

$$66.38 = 2E$$

$$E = \frac{66.38}{2} = 33.19$$

26. Ans(c)

2.5 molal NH_4OH means 2.5 moles of NH_3 in 1000 g of H_2O (\approx 1000 cc of solution). Hence, 100 cc solution requires NH_3

$$= 0.25 \text{ mol} = 0.25 \times 22.4 \text{ L} = 5.6 \text{ L}$$

27. Ans(a)

No. of moles of $\text{Na}_2\text{C}_2\text{O}_4$ in 100 ml of 0.2 M solution = $100 \times 10^{-3} \times 0.2 = 0.02$

No. of moles of $\text{C}_2\text{O}_4^{2-}$ ions furnished by 0.02 moles of $\text{Na}_2\text{C}_2\text{O}_4 = 0.02$ mols

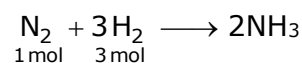
No. of oxalate ions = $0.02 \times 6.02 \times 10^{23} = 1.24 \times 10^{22}$.

28. Ans(b)

$$\text{Moles of N}_2 \text{ present originally} = \frac{6.0 \times 10^{22}}{6.02 \times 10^{23}} = 0.099$$

$$\text{Moles of N}_2 \text{ removed} = \frac{700 \text{ g} \times 10^{-3}}{28 \text{ g}} = 0.025$$

Moles of N_2 left = $0.099 - 0.025 = 0.074$ moles

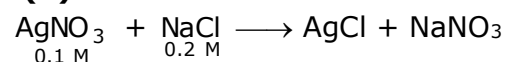


No. of moles of H_2 required by 0.074 moles of

$$\text{N}_2 = 3 \times 0.074 = 0.222$$

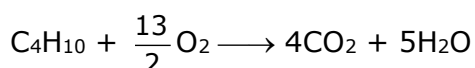
Mass of 0.222 moles of

$$\text{H}_2 = 0.222 \times 2 = 0.444 \text{ g}$$

29. Ans(b)

0.1 M AgNO_3 reacts with 0.1 M NaCl to produce 0.1 M AgCl and 0.1 M NaNO_3

$$\therefore \text{NO}_3^- = \frac{0.1 \text{ M}}{2} = 0.05 \text{ M}$$

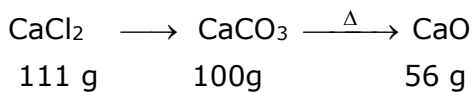
30. Ans (d)

$$58 \text{ g} \longrightarrow 208 \text{ g}$$

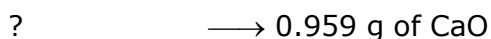
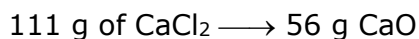
$$1000 \text{ g} \longrightarrow ?$$

$$\therefore \frac{1000 \times 208}{58} = 3586 \text{ g} = 3.58 \text{ kg.}$$

31. Ans (d)



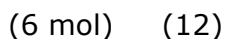
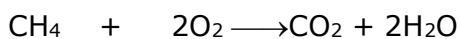
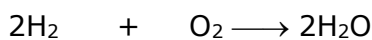
Mass of CaO formed = 0.959 g



1.9 g of CaCl₂ gives 0.959 g of CaO

$$\% \text{ of CaCl}_2 = \frac{1.9}{4.22} \times 100 = 45\%$$

32. Ans (a)



No. of moles of O₂ required = 1.5 + 12 = 13.5

∴ Additional O₂ needed = 13.5 - 1 = 12.5

$$\text{For } 300 \text{ ml} = \frac{300 \times 125}{100} = 375 \text{ ml}$$

33. Ans(d)

In the 1st oxide, oxygen = 27.6 parts, metal = 100 - 27.6 = 72.4 parts.

In the 2nd oxide, oxygen = 30 parts, metal = 100 - 30 = 70 parts.

As 1st oxide is M₃O₄. 72.4 parts of M = 3 atoms of M and 27.6 parts of O = 4 atoms of O.

$$\therefore 70 \text{ parts of M} = \frac{3}{72.4} \times 70 \text{ atoms of M} = 2.9 \text{ atoms of M}$$

$$30 \text{ parts of O} = \frac{4}{27.6} \times 30 \text{ atoms of O} = 4.35 \text{ atoms of O.}$$

∴ Ratio of M : O in the 2nd oxide = 2.9 : 4.35 = 1.15 = 2 : 3.

34. Ans (a)

$$\text{Molar volume of DNA sample} = \frac{\text{Molar mass}}{\text{Density}}$$

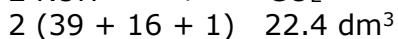
$$= \frac{6 \times 10^8 \text{ gmol}^{-1}}{1.1 \text{ gcm}^{-3}} = 5.45 \times 10^8 \text{ cm}^3$$

∴ Volume of one DNA molecule

$$= \frac{5.45 \times 10^8}{6.022 \times 10^{23}} \text{ cm}^3 = 0.9 \times 10^{-15} \text{ cm}^3$$

$$= 1.0 \times 10^{-15} \text{ cm}^3$$

35. Ans (a)



22.4 dm³ of CO₂ at STP require KOH = 112 g

∴ 11.2 dm³ of CO₂ of STP will require KOH = 56 g
∴ 100 mL PH₃ will result in increase = 50 mL

36.Ans (d)

Molecular mass of C₆₀H₁₂₂ is
= 12 × 60 + 1 × 122
= 720 + 122 = 842
∴ Mass of one molecule of C₆₀H₁₂₂
= $\frac{842 \text{ g}}{6.02 \times 10^{23}} = 1.4 \times 10^{-21} \text{ g}$

37.Ans(b)

10²⁰ grains are distributed in 1 sec
∴ 6.022 × 10²³ grains will be distributed in time
= $\frac{6.022 \times 10^{23}}{10^{20}} = 6022 \text{ sec} = 1.673 \text{ hrs.}$

38.Ans:(a)

1.71 g of C₁₂H₂₂O₁₁ = $\frac{1.71}{342}$ moles
= 5 × 10⁻³ mol
= 5 × 10⁻³ × 6.02 × 10²³ × 12 C-atoms.
= 3.6 × 10²² C-atoms.

39.Ans:(a)

392 mg = 0.392 g = $\frac{0.392}{98}$ moles of H₂SO₄
1.204 × 10²¹ molecules of H₂SO₄
= $\frac{1.204 \times 10^{21}}{6.022 \times 10^{23}} = 0.002 \text{ mole}$
∴ No. of moles of H₂SO₄ left = 0.004 – 0.002 = 0.002 = 2.0 × 10⁻³

40.Ans (c)

28 g N₂ = 1 mole and 32 g of O₂ = 1 mole
∴ N₂ and O₂ are diatomic and number of moles are same so molecules are same

41.Ans (c)

Atomic mass of metal = Eq. mass × valency = 32 × 2 = 64
Formula of metal nitrate = M(NO₃)₂
∴ molecular mass of the metal nitrate = 64
2(14 + 3 × 16) = 188

42.Ans (d)

The balanced equation is 4NH₃ + 5O₂ → 4NO + 6H₂O
From the equation 4 × 17 g of NH₃ require O₂ = 5 mol
6.8g Of NH₂ require O₂ = $\frac{5 \times 6.8}{4 \times 17} = 0.5 \text{ mol}$

43.Ans (b)

$$\text{Molarity} = \frac{0.793 \times 10^3 \text{ g/L}}{32} = 24.78 \text{ mol}^{-1}$$

$$M_1V_1 = M_2V_2$$

$$24.78 \times V_1 = 0.25 \times 2.5$$

$$V_1 = \frac{0.25 \times 2.5}{24.78} = 0.025 \text{ L} = 25.22 \text{ ml}$$

44. Ans (b)

Eq. mass of metal combines with equivalent mass of chlorine.

$$\text{Eq. mass of metal chloride} = 4.5 + 35.5 = 40$$

$$(40) \times n = 80$$

$$n = \frac{80}{40} = 2$$

∴ Valency of metal = 2

$$\begin{aligned} \text{Atomic mass of metal} &= \text{Eq. mass} \times \text{valency} \\ &= 4.5 \times 2 = 9 \end{aligned}$$

45. Ans (a)

$$1 \text{ M NaOH} = 1 \text{ N NaOH}$$

$$\frac{W}{E} = \frac{VN}{1000}$$

(dibasic acid) (NaOH)

$$\frac{1.575}{E} = \frac{25 \times 1}{1000}$$

$$E = \frac{1.575 \times 1000}{25}$$

Eq. mass of dibasic acid = 63

Molar mass of dibasic acid = Eq. mass \times basicity = 63 \times 2 = 126

a) 30 g mol⁻¹ b) 28 g mol⁻¹ c) 26 g mol⁻¹ d) 24 g mol⁻¹

46. (d)

Molar mass of CH₄ = 16 g mol⁻¹

Molar mass of C₂H₄ = 28 g mol⁻¹

When they are present in the ratio a : b, their average molar mass

$$= \frac{a \times 16 + b \times 28}{a + b} = 20 \text{ g mol}^{-1}$$

i.e., 16a + 28b = 20(a + b)

or 4a + 7b = 5(a + b) or a = 2b

$$\text{or } \frac{a}{b} = \frac{2}{1} = 2:1$$

If the ratio is reversed, now the ratio a : b = 1 : 2

$$\therefore \text{Average molar mass} = \frac{1 \times 16 + 2 \times 28}{1 + 2} = \frac{16 + 56}{3} = \frac{72}{3} = 24 \text{ g mol}^{-1}$$

47. (a)



1 mole 3 mole

0.5 mole 1.5 mole

$$13.5 \text{ g Al} = \frac{13.5}{27} = 0.5 \text{ mole of Al}$$

Number of electrons = $n \times$ Avagadro number

$$= 1.5 \times 6.022 \times 10^{23}$$

$$= 9.033 \times 10^{23} \text{ electrons}$$

48. **Ans (c)**

: Equal volumes contain equal no. of molecules.

Hence, volume of CH_4 = volume of C_2H_6

$$= 2.24/2 = 1.12 \text{ each}$$

$$\text{Mass of 1.12 L of CH}_4 = \frac{16}{22.4} \times 1.12 = 0.8 \text{ g}$$

$$\text{Mass of 1.12 L of C}_2\text{H}_6 = \frac{30}{22.4} \times 1.12 = 1.5 \text{ g}$$

$$\text{Total mass of the mixture} = 0.8 + 1.5 = 2.3 \text{ g}$$

49. **Ans(c)**

: Pure ethyl alcohol = $81.4 - 0.002 = 81.398 \text{ g}$. As 81.4 has least decimal places viz. one, reported answer after rounding off = 81.4

50. **Ans: (c)**

Mass of metal chloride = 1g

Mass of chlorine = 0.835 g

Mass of metal = $(1 - 0.835) = 0.165 \text{ g}$

$$\text{Equivalent mass of metal} = \frac{0.165 \times 35.5}{0.835} = 7.01$$

$$\text{Valency of the metal} = \frac{2 \times \text{V.D}}{E + 35.5} = \frac{2 \times 85}{7.01 + 35.5} = 4$$

Formula of the chloride = MCl_9