

# CHEMISTRY

**CLASS-XI**

**NEET**

**EXPLANATIONS**

Video Solution will  
be provided soon

**Get complete class  
11th NEET study  
material(hard copies)  
delivered at your home  
at the lowest cost of**

**Rs1899/- only**

Order from book section of pw app

HELLO बच्चों



**Physics Wallah**

# Answer Key

## Topic-wise Questions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
a	d	c	c	d	d	a	b	c	a	b	c	b	c	b	a	c	c
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
a	d	b	d	b	c	b	d	c	c	a	d	d	c	b	d	c	b
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
b	c	c	b	b	b	a	b	c	d	c	b	a	b	d	d	d	c
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
d	c	c	d	c	c	d	a	a	d	b	b	c	a	c	a	d	a
73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
c	a	b	d	b	b	a	b	a	a	b	d	b	c	c	b	a	d
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
a	b	b	b	b	c	a	c	b	d	d	b	c	b	a	a	b	b
109	110																
c	b																

## NCERT Based Questions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
b	d	d	b	c	c	b	a	a	a	b	d	c	d	b	a	a	a
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
c	d	a	b	a	b	b	a	b	d	b	d	c	c	c	c	a	c
37	38	39	40														
c	d	a	b														

## Multi-Concept Questions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
a	b	a	b,c	a	b	d	b	a	a	c	a	d	c	b	b	a	c
19	20	21	22	23	24												
a,c	d	b	d	a	c												

## NEET Past 10 Year Questions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
c	c	c	d	a	c	c	a	c	b	c	d	d	c	b	a	a	a

# 1. Some Basic Concepts of Chemistry



Scan for Video Solution

## Topic-wise Questions

1. (a) The number of significant figures in 0.0045 are two because zeros to the left of the first non-zero digit are not significant.
2. (d)  $d = s \times t$   
 $= (3 \times 10^8 \text{ m/s}) (10^{-15} \text{ s})$   
 $= 3 \times 10^{-7} \text{ m}$   
 $= 3 \times 10^{-4} \text{ mm} = 0.0003 \text{ mm}$
3. (c) 1 Barn =  $10^{-28} \text{ m}^2$
4. (c) 7.00 is more accurate than 7.0 because the former has three significant figures while the later has two.
5. (d)  $\pi$  is irrational number (please note that  $\pi \neq 22/7$  as  $22/7$  is a rational number) and it means it has infinite number of significant figures.
6. (d) According to rule (2) zero between '5' and '4' is also significant
7. (a)  $29.4406 + 3.2 + 2.25 = 34.8906$ . As 3.2 has least number of decimal places, i.e., one, therefore sum should contain one decimal place only. After round off, reported sum is 34.9, which has three significant figures.
8. (b) Area = length  $\times$  width  
 $= (12.34 \text{ cm}) \times (1.23 \text{ cm}) = 15.1782 \text{ cm}^2$   
 $\approx 15.19 \text{ cm}^2$
9. (c)  $0.2876 \text{ g} \times 9 = 2.5884 \text{ g}$   
 $= 2.588 \text{ g}$
10. (a) According to rule (1) all non zero digits are significant
11. (b)  $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$
12. (c) Law of reciprocal proportion.
13. (b) Hint: Total mass of reactants = Mass of products.
14. (c) Law of reciprocal proportion
15. (b) Law of conservation of mass not applicable to nuclear reactions
16. (a) According to law of constant proportion
17. (c) 1g of X combines with Y = 35.5 g  
 $\therefore$  2 g of X combines with Y =  $2 \times 35.5 \text{ g} = 71 \text{ g}$
18. (c) In First Oxide  $\text{N}_2\text{O}$ : Mass of 2.24 L of nitrogen at STP = 2.8g  
 $\therefore$  Mass of Oxygen =  $4.4 - 2.8 = 1.6 \text{ g}$   
 In Second Oxide  $\text{N}_2\text{O}_2$ : Mass of 22.4 L of nitrogen at STP = 28 g  
 $\therefore$  Mass of oxygen =  $60 - 28 = 32 \text{ g}$   
 $\therefore$  In second oxide 2.8 g of nitrogen combines with 3.2 g of oxygen.

Keeping the mass of nitrogen same in both the oxides, the different masses of oxygen which combines with 2.8 g of nitrogen are 1.6 g : 3.2 g or 1 : 2, This is a simple whole number ratio. This illustrates the law of multiple proportions.

19. (a) Law of conservation of mass
20. (d)  $\text{SO}_2, \text{SO}_3$
21. (b)  $\text{H}_3\text{PO}_4 + 3\text{NaOH} \rightarrow \text{Na}_3\text{PO}_4 + 3\text{H}_2\text{O}$   
 As 1 mole  $\text{H}_3\text{PO}_4$  neutralize 3 mole of NaOH. 120 g of NaOH is 3 moles. So, 98 g of  $\text{H}_3\text{PO}_4$  will neutralize 120 g of NaOH.
22. (d)  $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$
23. (b)  $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$   

20.8 g	9.8 g	x	7.3 g
--------	-------	---	-------

 mass of  $\text{BaSO}_4$  produced  
 $x = 20.8 + 9.8 - 7.3 = 23.3 \text{ g}$
24. (c) In  $\text{CO}_2$ , 12 parts by mass of C combine with 32 parts by mass of oxygen while in  $\text{SO}_2$ , 32 parts by mass of S combine with 32 parts by mass of oxygen. The ratio of masses of carbon and sulphur which combine with a fixed mass of oxygen is 12 : 32 or 3 : 8. In  $\text{CS}_2$ , 12 parts of carbon combines with 64 parts by mass of sulphur therefore 12 : 64, i.e., 3 : 16.  
 $\therefore$  The ratios are  $\frac{3}{8} : \frac{3}{16}$  or 2 : 1
25. (b)  $\text{C}_2\text{H}_5\text{OH} + \text{Na} \rightarrow \text{C}_2\text{H}_5\text{ONa} + \frac{1}{2}\text{H}_2$
26. (d) 

$\text{H}_2\text{O}$	$\text{H}_2\text{O}_2$
H : O	H : O
5.93 : 94.07	11.2 : 88.8 or
	5.93 : 47.0

 Ratio of different masses of O which combines with fixed mass of H is 94.07 : 47.0 or 2 : 1
27. (c) In B, 32 parts of X combines with Y = 84 parts  
 $\therefore$  16 parts of X combine with Y = 42 parts  
 Now, number of parts of X in both B and C is equal.  
 Different masses of Y which combine with same mass of X in B and C are in the ratio 3:5  
 $\therefore \frac{\text{Mass of Y in B}}{\text{Mass of Y in C}} = \frac{3}{5}$   
 $\therefore \text{Mass of Y in C} = \frac{5}{3} \times 42$   
 $= 70 \text{ parts}$

28. (c)  $3.4 \text{ amu S} \rightarrow 100 \text{ amu insulin}$

$$32 \text{ amu S} \rightarrow \frac{100}{3.4} \times 32 = 941 \text{ amu}$$

29. (a) Mass of one mole of a substance remains same

30. (d) Average relative at Atm.wt

$$A.W = \frac{20 \times 10 + 80 \times 11}{100}$$

$$= \frac{200 + 880}{100}$$

$$= \frac{1080}{100} = 10.8 \text{ g}$$

31. (d) No. of molecules =  $\frac{W}{M.w} \times N$

32. (c) Gram molecular weight of any substance contains Avagadro number of molecules.

33. (b) No. of atoms =  $\frac{W_t}{MW} \times N \times \text{atomicity}$

34. (d) One amu =  $1.66 \times 10^{-24} \text{ g}$

35. (c) The number of molecules present in 1 ml of a gas at STP is known as loschmidt number.

36. (b) Verify options by calculating no. of moles

37. (b) Apply,

$$\text{weight} = \frac{\text{absolute at. wt.}}{1 \text{ amu}}$$

$$14 = \frac{\text{absolute at. wt.}}{\frac{1}{12} \times \frac{12}{N_A} \text{ g}} \quad \dots\dots(1)$$

$$x = \frac{\text{absolute at. wt.}}{\frac{1}{5} \times \frac{12}{N_A} \text{ g}} \quad \dots\dots(2)$$

$$x = 5.83 \text{ amu}$$

38. (c) 100 g Haemoglobin contains Fe = 0.34 g  
1 mole haemoglobin contains Fe = 4 mole  $\text{Fe}^{2+}$   
 $= 4 \times 56 = 224 \text{ g}$

0.34 g Fe is present in Haemoglobin = 100 g

$$224 \text{ g Fe is present in Haemoglobin} = \frac{100}{0.34} \times 224 = 65882 \text{ g}$$

39. (c) 1 g – atom of nitrogen =  $6.02 \times 10^{23}$  N atoms  
1 mol of N = 1/2 mole of  $\text{N}_2$  = 11.2 L at S.T.P

40. (b) 10 g of  $\text{CaCO}_3$  = 0.1 mol of  $\text{CaCO}_3$   
 $= 0.1 \times 3$  g – atom of Oxygen  
 $= 0.3$  g atoms of oxygen

41. (b) Magnesium bicarbonate is  $\text{Mg}(\text{HCO}_3)_2$ . So, 146 g of  $\text{Mg}(\text{HCO}_3)_2$  contains O atom =  $0.6 N_A$

42. (b) Molecular mass of  $\text{CO}_2$  =  $44 \text{ g mol}^{-1}$   
 $\therefore 4 \text{ mol of } \text{CO}_2 = 44 \times 4 = 176 \text{ g}$

(c)  $6.02 \times 10^{23}$  atoms of hydrogen has mass = 1.008 g

$= 12 \times 10^{24}$  atoms of hydrogen has mass = 20.1 g

(d) 22.4 L of helium at N.T.P. has mass = 4 g 11.2 L of helium at N.T.P. has mass = 2 g

Thus; 4 moles of  $\text{CO}_2$  has maximum mass

43. (a) In 12 g of carbon, the amount of C – 14

$$= \frac{12 \times 2}{100} = 0.24$$

$$\therefore \text{C-14 atoms in } 0.24 \text{ g} = \frac{0.24 \times 6.02 \times 10^{23}}{14}$$

$$= 1.03 \times 10^{22} \text{ atoms}$$

44. (b) Mass of 22.4 L gas at S.T.P. =  $\frac{8 \times 22.4}{5.6} = 32 \text{ g}$  (it is also

equal to mol. mass)

Mol. mass = 32

$$\therefore \text{V.D.} = \frac{32 \times 1}{2} = 16$$

45. (c) Mass of 1 atom =  $1.8 \times 10^{-22} \text{ g}$

Mass of  $6.022 \times 10^{23}$  atoms

$$= 6.02 \times 10^{23} \times 1.8 \times 10^{-22}$$

$$= 108.36 \text{ g}$$

$\therefore$  Atomic mass of element = 108.36 g

46. (d) 1 M produces ions = 3 moles

$\therefore 0.1 \text{ M } \text{H}_2\text{SO}_4$  produce ions = 0.3 mol

$$\text{Number of ions} = 0.3 \times 6.02 \times 10^{23} = 1.8 \times 10^{23}$$

47. (c) 0.1 Mol  $\text{CaCO}_3$  =  $0.1 \times 100 = 10 \text{ g}$

$$\text{Ca}^{2+} = \frac{1.51 \times 10^{23}}{6.023 \times 10^{23}} \times 40 = 10 \text{ g}$$

$$\text{CO}_3^{2-} = 0.16 \times 60 = 9.6 \text{ g}$$

$$\text{Br} = \frac{7.525 \times 10^{22}}{6.02 \times 10^{23}} \times 80 = 10 \text{ g}$$

48. (b) Equal volume under similar conditions of temperature and pressure have fixed number of molecules.

49. (a) Moles of sugar added =  $\frac{1.71}{342} = 5 \times 10^{-3}$

$$\text{Carbon atoms added} = 12 \times 5 \times 10^{-3} \times 6.02 \times 10^{23} = 3.61 \times 10^{22}$$

50. (b) 0.1 mole  $\text{P}_4$  contains =  $4 \times 0.1 \times 6.02 \times 10^{23}$   
0.05 mole of  $\text{S}_8$  contains =  $8 \times 0.05 \times 6.02 \times 10^{23}$  atoms

51. (d) 82 g of  $\text{N}_2 = \frac{82}{28}$  g-molecule = 2.92 moles

52. (d) Since; mass of oxygen is fixed. Therefore, the number of g-atom and also the number of atoms will be fixed.

$$\text{i.e, Atoms of Oxygen} = \frac{1 \times 2}{32} \text{ in } \text{O}_2$$

$$= \frac{1}{16} \text{ in atomic Oxygen}$$

$$= \frac{1 \times 3}{48} \text{ in } \text{O}_3$$

## Some Basic Concepts of Chemistry

53. (d) 12.8 g of  $\text{SO}_2 = 4.48 \text{ L}$   
 $6.02 \times 10^{22}$  molecules of  $\text{CH}_4 = 2.24 \text{ L}$   
 $0.5 \text{ mol of NO}_2 = 11.2 \text{ L}$   
 $1 \text{ g molecule of CO}_2 = 22.4 \text{ L}$

54. (c) G.M.M of  $\text{O}_2 = 32 \text{ g}$

$$\text{eq mass} = \frac{\text{At.mass of O}}{\text{valency}} = \frac{16}{2}$$

$$= 8 = \frac{1}{4} = \frac{N_A}{4}$$

55. (d) No of mol of triatomic gas

$$= \frac{224 \text{ ml}}{22400 \text{ ml mole}^{-1}} = 10^{-2} \text{ mol}$$

$$\text{No. of molecules} = 10^{-2} \text{ mol} \times (6.02 \times 10^{23} \text{ molecules mol}^{-1})$$

$$\text{no. of atoms of gas} = 6.02 \times 10^{21}$$

$$= 3 \times 6.02 \times 10^{21} = 18.06 \times 10^{21}$$

$$1.806 \times 10^{22} \text{ atoms has mass} = 1 \text{ g}$$

$$1 \text{ atom has mass} = \frac{1}{1.806 \times 10^{22} \text{ g}}$$

$$= \frac{10^{-22} \text{ g}}{1.806}$$

$$= 0.554 \times 10^{-22} \text{ g}$$

$$= 5.54 \times 10^{-23} \text{ g}$$

56. (c) Mass of 1 mole of electrons  
 $= 9.11 \times 10^{-31} \text{ kg} \times 6.02 \times 10^{23}$   
 $= 5.5 \times 10^{-7} \text{ kg mol}^{-1}$

57. (c) If 3.18 mol of hydrogen atom are there, then number of moles of oxygen atoms

$$= \frac{3.18}{3} \text{ mol} = 1.06 \text{ mol}$$

58. (d) Molar mass of  $\text{C}_{10}\text{H}_{16}\text{O} = 120 + 16 + 16$   
 $= 152 \text{ g mol}^{-1}$

$$25.0 \text{ mg} = 25.0 \text{ mg} \times \left( \frac{1 \text{ g}}{10^3 \text{ mg}} \right) \times \left( \frac{1 \text{ mol}}{152 \text{ g}} \right) \times \left( \frac{27 \times 6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} \right)$$

$$= \frac{25 \times 27 \times 6.02}{152} \times 10^{20} \text{ atom}$$

$$= 2.67 \times 10^{21} \text{ atoms}$$

59. (c) Molar mass of  $\text{CO}_2 = 44 \text{ g mol}^{-1}$   
 $44 \text{ g CO}_2 = 3 \times 6.02 \times 10^{23} \text{ atoms}$

$$\therefore 1 \text{ g of CO}_2 = \frac{3 \times 6.02 \times 10^{23}}{44} \text{ atoms} = 0.410 \times 10^{23}$$

Similarly 1g of  $\text{C}_8\text{H}_{18}$ ,  $\text{C}_2\text{H}_6$  and  $\text{LiF}$  contains  $0.18 \times 10^{23}$  atoms,  $1.60 \times 10^{23}$  atoms and  $0.46 \times 10^{23}$  atoms respectively.

60. (c)  $\frac{4}{40} \times N_A = \frac{N_A}{10} \text{ atom}$   
 $0.5 \text{ M Na}_2\text{SO}_4$   
 $= \frac{0.5 \times 2}{100} \times N_A = \frac{N_A}{10}$

61. (d)  $\text{SO}_2 \rightarrow$  Contain 3 atom

$$n = \frac{\text{wt.}}{\text{M.wt.}} = \frac{64}{64} \times 3N_A$$

$$= 3 \times 6.02 \times 10^{23}$$

62. (a) Total  $e^- + p + n^0 = 18$

$$18 \times N_A = 1.084 \times 10^{25}$$

63. (a) 111 g anhydrous  $\text{CaCl}_2 = 1 \text{ mole CaCl}_2$   
 $1 \text{ mole CaCl}_2$  contain 1 mole  $\text{Ca}^{+2}$  and 2 mole  $\text{Cl}^-$

64. (d) 1 g molecule of  $\text{CO}_2 = 1 \text{ mole CO}_2$   
 $1 \text{ mole CO}_2$  occupy  $\rightarrow 22.4 \text{ L}$

65. (b) 224 g contain 36 g of water  
 $488 \text{ g contain } 2 \times 36 \text{ g of water}$   
 $18 \text{ g of water} = 1 \text{ mole}$   
 $72 \text{ g of water} = 4 \text{ mole}$

66. (b) 4.4 g  $\text{CO}_2 = 0.1 \text{ mole CO}_2$  molecule  
 $2.24 \text{ L H}_2$  at STP = 0.1 mole  $\text{H}_2$  molecule  
 $= 0.2 \text{ mole molecules}$   
 $= 0.2 \times 6.023 \times 10^{23} = 1.20 \times 10^{23}$

67. (c) 22.4 L Vol. of gas at STP = 1 mole

68. (a) 1 mole of  $\text{P}_4 = 4 \times N_A$   
 $0.1 \text{ mole of P}_4 = 4 \times 0.1 \times N_A$   
 $= 4 \times 0.1 \times 6.022 \times 10^{23}$   
 $= 2.4088 \times 10^{23} \text{ atoms}$

69. (c)  $C\% : H\% : N\% = \frac{40}{12} : \frac{13.3}{1} : \frac{46.7}{14}$

70. (a) Mass of chloride =  $(B_2 - B_1) \text{ g}$   
 $(B_2 - B_1) \text{ g combines with metal} = B_1 \text{ g}$   
 $\therefore 35.5 \text{ g combines with metal} = \frac{35.5 \times B_1}{B_2 - B_1} \text{ g}$

71. (d)

	Mass in "g"	% age	H. Ratio	S.R
C	24	40	$40/12 = 3.33$	1
H	4	6.66	$6.66/1 = 6.66$	2
O	32	53.33	$53.33/16 = 3.33$	1
Empirical formula : $\text{CH}_2\text{O}$				

72. (a)

Element	%	At. mass	$\frac{\%}{\text{At.mass}}$	Simplest ratio
A	25	12.5	$25/12.5 = 2$	1
B	75	37.5	$75/37.5 = 2$	1

The formula of the compound is AB

73. (c) For minimum molecular mass, insulin must have at least one sulphur atom in its one molecule.

$$\begin{aligned}\text{If it has 32 g S, then mol. mass} &= \frac{100 \times 32}{3.4} \\ &= 941.176 \text{ g}\end{aligned}$$

74. (a) Mol. mass of  $\text{Fe}(\text{CHCOO})_2 = 170 \text{ g}$

$$\begin{aligned}\text{Fe in 100 gms of Fe}(\text{CHCOO})_2 &= \frac{56 \times 100}{170} \\ &= 32.9 \text{ mg}\end{aligned}$$

Total Fe in 400mg of capsule = 32.9 mg

$$\text{percentage of Fe} = \frac{32.9 \times 100}{400} = 8.2\%$$

75. (b)

Element	%	At. mass	Mass Ratio	S.R
X	50	10	5	2
Y	50	20	2.5	1

E.E. =  $\text{X}_2\text{Y}$

76. (d) E.F. =  $\text{C}_3\text{H}_4\text{O}$

E.F. Mass =  $12 \times 3 + 4 \times 1 + 16 = 56$

$$n = \frac{170 \pm 5}{56} = 3$$

$$\therefore \text{M.F.} = (\text{C}_3\text{H}_4\text{O})_3 = \text{C}_9\text{H}_{12}\text{O}_3$$

77. (b)

		Oxide (I)	Oxide (II)
Metal;	M	50%	40%
Oxygen;	O	50%	60%

As first Oxide is  $\text{MO}_2$

let atomic mass of M = x

$$\therefore \% \text{ of O} = \frac{32}{x + 32} \times 100$$

$$\text{or } \frac{50}{100} = \frac{32}{x + 32}$$

$$x = 32$$

At. mass of metal M, x = 32

let formula of second Oxide  $\text{M}_2\text{O}_n$

$$\begin{aligned}\% \text{ of M} &= \frac{2x}{2x + 16n} \times 100 = \frac{64}{64 + 16n} \times 100 \\ \frac{40}{100} &= \frac{64}{64 + 16n}\end{aligned}$$

$$0.25 n = 2.5 - 1 = 1.5$$

$$n = \frac{1.5}{0.25} = 6$$

Now, formula of second oxide

=  $\text{M}_2\text{O}_6$  or  $\text{MO}_3$

78. (b) Molecular mass of B = M

V.D. of B = M/2

V.D. of A =  $4 \times$  V.D. of B

$$4 \times \frac{M}{2} = 2M$$

Molecular mass of A =  $2 \times 2M = 4M$

$$79. (a) \text{ Moles of N} = \frac{28}{14} = 2$$

$$\text{Moles of metal, M} = \frac{100 - 28}{a} = \frac{72}{a}$$

$$\text{Mole ratio, M:N} = \frac{72}{a} : 2 = 3:2$$

$$\frac{72}{a} = 3$$

$$a = \frac{72}{3} = 24$$

$$80. (b) \frac{M(\text{G})}{M(\text{N}_2)} = \frac{0.44}{0.28} \text{ (Given)}$$

$$\therefore M_{(\text{G})} = \frac{0.44}{0.28} \times 28 = 44 \text{ g}$$

81. (a)  $44 \text{ CO}_2 = 1 \text{ mol carbon}$

$3.38 \text{ g CO}_2 = 0.0768 \text{ moles carbon}$

$18 \text{ g H}_2\text{O} = 2 \text{ mol of hydrogen atoms}$

$0.690 \text{ g H}_2\text{O} = 0.0767 \text{ mol hydrogen atoms}$

Molar ratio of C : H = 1:1

$\therefore$  Empirical formula of hydrocarbon is CH

$$82. (a) \% \text{ of C} = \frac{\text{Wt}}{\text{M.Wt}(\text{CO}_2)} \times 100 = \frac{12}{44} \times 100 = 27.27$$

83. (b) 100 g haemoglobin has = 0.33 g Fe  
67200 g haemoglobin has Fe

$$= \frac{0.33}{100} \times 67200$$

$$= 221.76 \text{ g}$$

1 mole of haemoglobin

$$= \frac{221.76}{56} \text{ g atom of Fe}$$

$$= 3.96 \text{ g atom of Fe} \approx 4.0 \text{ g atoms}$$

$$84. (d) \text{ Moles of Iodine} = \frac{254}{127} = 2$$

$$\text{Moles of Oxygen} = \frac{80}{16} = 5$$

formula :  $\text{I}_2\text{O}_5$

85. (b) 0.5 mol of  $\text{K}_4[\text{Fe}(\text{CN})_6]$

$$\text{has C} = \frac{1}{2} \times 6 \text{ mol}$$

$$= 3 \text{ mol or } 3 \times 12 = 36 \text{ g}$$

86. (c)  $\text{X}_2\text{O}$

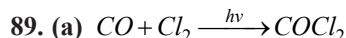
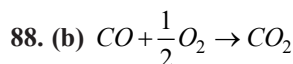
$$\text{X} = 7$$

$$\text{X} = 7 \times 2 = 14 \text{ g}$$

### Some Basic Concepts of Chemistry

87. (c)  $100 \rightarrow 20$

$? \rightarrow 28$



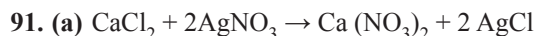
90. (d) The balanced equation is:



$$4 \times 17 \text{ g of } NH_3 \text{ (eq}^{-1}\text{)}$$

$$\text{Required } O_2 = 5 \text{ mol}$$

$$6.8 \text{ of } NH_3 \text{ require } O_2 = \frac{5 \times 6.8}{4 \times 17} \\ = 0.5 \text{ mol}$$



$$111 \text{ g} \qquad \qquad \qquad 2 \times 143.5 \text{ g}$$

$CaCl_2$  require to produce  $2 \times 143.5$  of  $AgCl = 111 \text{ g}$

$CaCl_2$  required to produce  $14.35 \text{ g}$  of  $AgCl$

$$= \frac{111 \times 14.35}{2 \times 143.5} = 5.55 \text{ g}$$



93. (b)  $M = \frac{w}{GM.w} \times \frac{1000}{V \text{ in ml}}$

94. (b)  $w = \frac{N \times E.wt \times V(\text{in ml})}{1000}$

95. (b)  $M = \frac{w}{\text{Molar mass}} \times \frac{1}{V \text{ in litres}}$

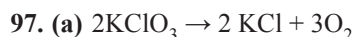


Pure  $H_2SO_4$  is required for 1 mole of

$$NaOH = 1/2 \text{ mole} = 49 \text{ g}$$

70%  $H_2SO_4$  required for 1 mole of  $NaOH$

$$= \frac{49 \times 100}{70} = 70$$



$$2 \times 122.5 \text{ g} \qquad \qquad \qquad 3 \times 32 \text{ g}$$

$3 \times 32 \text{ g}$  of  $O_2$  is produced from  $KClO_3 = 245 \text{ g}$

$48 \text{ g}$  of  $O_2$  is produced from  $KClO_3 = 245 \text{ g}$

$$\therefore 80\% KClO_3 \text{ needed} = \frac{122.5 \times 100}{80} \\ = 153.12 \text{ g}$$

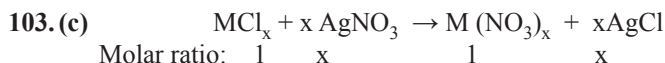
98. (c)  $N = \frac{\text{percentage} \times d \times 10}{E.wt}$

99. (b)  $\text{Mass \%}_{(s)} = \frac{n_s}{n_s + n_o}$

100. (d)  $\text{No. gram equivalents} = \frac{N \times V(\text{in ml})}{1000}$

101. (d)  $N = \frac{w}{E.wt} \times \frac{1000}{V(\text{in ml})}$

102. (b)  $m = \frac{w}{E.wt} \times \frac{1000}{b(\text{in gms})}$

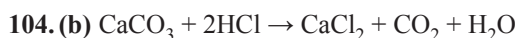


$$\text{Molar ratio: } \frac{1}{x} \qquad \qquad \qquad \frac{1}{x}$$

$$\text{Molecules of } AgNO_3 \text{ given} = \frac{0.6}{100} \times 500 = 3$$

$$\text{Moles of } MCl_x = 0.1$$

$\therefore$  The value of  $x = 3$



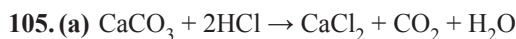
$$100 \text{ g} \qquad 73 \text{ g} \qquad \qquad \qquad 44 \text{ g}$$

100 ml of 20%  $HCl$  solution = 20 g  $HCl$

Here,  $CaCO_3$  is a limiting reagent

Hence,

$$20 \text{ g of } CaCO_3 = \frac{44}{100} \times 20 \text{ g of } CO_2 = 8.8 \text{ g of } CO_2$$



$$25 \text{ ml of } 0.75 \text{ molar } HCl = \frac{25}{1000} \times 0.75$$

$$= 0.01875 \text{ moles}$$

$$\text{Moles of } CaCO_3 \text{ required} = \frac{\text{moles of } HCl}{2}$$

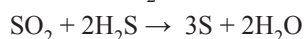
$$= \frac{0.01875}{2}$$

$$= 9.375 \times 10^{-3} \text{ moles}$$

$$\text{Mass of } CaCO_3 \text{ required} = 9.375 \times 10^{-3} \text{ moles} \times 100 \text{ g/moles} \\ = 0.94 \text{ g}$$



11.2 L of  $SO_2$  at N.T.P = 1/2 moles



Here  $SO_2$  is a limiting reactant

$$\therefore \text{ moles of sulphur produced} = 3 \times \text{ moles of } SO_2 \\ = 1.5 \text{ moles}$$



$\therefore$  1 mol of  $SO_2Cl_2$  in aqueous solution required is 2 moles  $Ca(OH)_2$

108. (b)  $\text{Moles of Na} = \frac{1.15 \text{ g}}{23 \text{ g mol}^{-1}} = 0.05 \text{ mol}$

$$\text{Moles of C} = \frac{3.01 \times 10^{22}}{6.02 \times 10^{23}} = 0.05 \text{ mol}$$

$$\text{Moles of O} = 0.1$$

Moles ratio, Na : C : O = 1 : 1 : 2

$\therefore$  Empirical formula –  $NaCO_2$





Here: HCl is a limiting reagent

$$\therefore \text{Moles of } \text{H}_2 \text{ produced} = \frac{\text{moles of HCl}}{2} = \frac{0.52}{2} = 0.26$$

110. (b)  $M = \frac{\text{Percentage} \times \text{specific gravity} \times 10}{\text{GMW}}$

$$M_1 V_1 = M_2 V_2$$

### NCERT Based Questions

1. (b) Volume term is absent

2. (d) 48 : 32

3. (d)  $\frac{4.25}{17} \times 4 = 1$

4. (b) Average of readings of student,

$$A = \frac{30.1 + 2.99}{2} = 3.00$$

Average of readings of student,

$$B = \frac{3.05 + 2.95}{2} = 3.00$$

Correct reading = 3.00

For both the students, average value is close to the correct value. Hence, readings of both are accurate.

5. (c) Since, molarity (M) is calculated by following equation

$$\text{Molarity} = \frac{\text{weight} \times 100}{\text{molecular weight} \times \text{volume (mL)}}$$

$$= \frac{5.85 \times 1000}{58.5 \times 500} = 0.2 \text{ molL}^{-1}$$

**Note:** Molarity of solution depends upon temperature because volume of a solution depends upon temperature.

6. (c) No of atoms =  $\frac{\text{given weight}}{\text{gram atomic weight}}$

Calculate for Fe and He.

7. (b) Let W% of  $\text{Ne}^{20} = x$

$$W \% \text{ of } \text{Ne}^{22} = 100 - x$$

$$20.2 = \frac{x \times 20 + (100 - x) \times 22}{100}$$

$$w \% \text{ of } \text{Ne}^{20} = 90 \%$$

$$w \% \text{ of } \text{Ne}^{22} = 100 - 90 = 10\%$$

$$\text{Ne}^{20} : \text{Ne}^{22} = 90 : 10 = 9 : 1$$

8. (a)  $6.023 \times 10^{23} \rightarrow \text{M.Wt}$   
 $10^{22} \rightarrow ?$

9. (a) 111 g  $\text{CaCl}_2$  has = N ions of  $\text{Ca}^{2+}$

$$\text{No. of molecules} = \frac{222}{111} \times N = 2N \text{ ions of } \text{Ca}^{2+}$$

$$111 \text{ g } \text{CaCl}_2 = 2N \text{ ions of } \text{Cl}^-$$

$$222 \text{ g of } \text{CaCl}_2 = \frac{2N \times 222}{111} \text{ ions of } \text{Cl}^- = 4N \text{ ions of } \text{Cl}^-$$

10. (a) E.F. Wt = 14 gm

$$\text{MW} = d \times 22.4$$

$$\text{M.F} = \text{E.F} \times \frac{\text{MW}}{\text{EF Wt.}}$$

11. (b) Given that,

$$M_1 = 5 \text{ M}$$

$$V_1 = 500 \text{ mL}$$

$$V_2 = 1500 \text{ mL}$$

$$M_2 = M$$

For dilution, a general formula is

$$M_1 V_1 = M_2 V_2$$

(Before dilution) (After dilution)

$$500 \times 5 \text{ M} = 1500 \times M$$

$$M = \frac{5}{3} = 1.66 \text{ M}$$

12. (d) For comparing number of atoms, first we calculate the moles as all are monoatomic and hence, moles  $\times N_A$  = number of atoms.

$$\text{Moles of } 4 \text{ g He} = \frac{4}{4} = 1 \text{ mol}$$

$$46 \text{ g Na} = \frac{46}{23} = 2 \text{ mol}$$

$$0.40 \text{ g Ca} = \frac{0.40}{40} = 0.1 \text{ mol}$$

$$12 \text{ g He} = \frac{12}{4} = 3 \text{ mol}$$

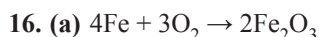
Hence, 12 g He contains greatest number of atoms as it possesses maximum number of moles.

13. (c) E.F. Wt = 30 gm

$$\text{MW} = 2 \times \text{V.D}$$

$$\text{M.F} = \text{E.F} \times \frac{\text{MW}}{\text{EF Wt.}}$$

$$14. (d) W \% \text{ of } N_2 = \frac{28}{22400} \times \frac{V \text{ of } N_2 \text{ at S.T.P}}{\text{Wt. of compound}} \times 100$$



$$17. (a) w = \frac{N \times \text{Eq.wt} \times V(\text{in ml})}{1000} = \frac{0.1 \times 63 \times 250}{1000} = 1.575 \text{ g}$$



18. (a)

	X	Y
A →	1	$\frac{60}{40}$
B →	1	$\frac{75}{25}$

19. (c) In the given question, 0.9 g L<sup>-1</sup> means that 1000 mL (or 1 L) solution contains 0.9 g of glucose.

$$M = \frac{\text{conc in L}^{-1}}{\text{Molar mass}} = \frac{0.90}{180} = 0.005 \text{ M}$$

20. (d) Molality (m) =  $\frac{\text{Moles of solute}}{\text{Mass of solvent (in kg)}}$  .....(i)

Given that, Mass of solvent (H<sub>2</sub>O) = 500 g = 0.5 kg

Weight of HCl = 18.25 g

Molecular weight of HCl = 36.5 g

$$\text{Moles of HCl} = \frac{18.25}{36.5} = 0.5 = \frac{0.5}{0.5} = 1 \text{ m}$$

21. (a) No. of moles =  $\frac{W}{MW}$

22. (b) 22400 cc of a gas at STP = 6.023 × 10<sup>23</sup> molecules

So, 1.12 × 10<sup>-7</sup> cc of a gas at STP = ?

$$= \frac{1.12 \times 10^{-7} \times 6.023 \times 10^{23}}{22400}$$

$$= 3.01 \times 10^{12} \text{ molecules}$$

23. (a) No. of moles =  $\frac{Wt}{M.wt}$  or  $\frac{\text{No. of molecules}}{N}$

24. (b) The at. no. of N and O are 1/2 of their Mass no. So, one molecule of 92 g molecular weight will have 46 electrons so 1 gm of molecule contain 46 N e<sup>-</sup>s.

25. (b) No. of moles =  $\frac{W}{MW}$

1 mole contain 2 mole of water

26. (a) One mole of any substance contains 6.022 × 10<sup>23</sup> atoms/ molecules.

Hence, Number of millimoles of H<sub>2</sub>SO<sub>4</sub>

= molarity × volume in mL

= 0.02 × 100 = 2 millimoles

= 2 × 10<sup>-3</sup> mol

Number of molecules = number of moles × 6.022 × 10<sup>23</sup>

= 2 × 10<sup>-3</sup> × 6.022 × 10<sup>23</sup>

= 12.044 × 10<sup>20</sup> molecules

27. (b) Molecular mass of CO<sub>2</sub> = 1 × 12 + 2 × 16 = 44 g

1 g molecule of CO<sub>2</sub> contains 1 g atoms of carbon

∴ 44 g of CO<sub>2</sub> contain C = 12 g atoms of carbon

$$\therefore \% \text{ of C in CO}_2 = \frac{12}{44} \times 100 = 27.27\%$$

Hence, the mass per cent of carbon in CO<sub>2</sub> is 27.27%.

28. (d)  $\frac{Wt}{At.wt} = \text{no. of gram atoms}$

$$Mg : C : N = \frac{12}{24} : \frac{12}{12} : \frac{14}{14}$$

29. (b) Calculate relative No. of atoms of nitrogen and oxygen

$$N : O = \frac{36.8}{14} : \frac{100 - 36.8}{16}$$

30. (d)  $C_xH_y + \left(x + \frac{y}{4}\right)O_2 \rightarrow xCO_2 + \frac{y}{2}H_2O$

$$x = \frac{160}{40} = 4 \text{ and } x + y = \frac{26}{4}$$

$$\frac{Y}{4} = \frac{10}{4}$$

$$\therefore Y = 10$$

31. (c) 2gm of H<sub>2</sub> → 16 gm of O<sub>2</sub>

32. (c)  $N = \frac{\text{No. of milliequivalents}}{V \text{ (in ml)}}$

33. (c)  $M = \frac{\text{percentage} \times 10 \times d}{GMW}$

34. (c) Empirical formula mass = CH<sub>2</sub>O

$$= 12 + 2 \times 1 + 16 = 30$$

Molecular mass = 180

$$n = \frac{\text{Molecular mass}}{\text{Empirical formula mass}}$$

$$= \frac{180}{30} = 6$$

∴ Molecular formula = n × empirical formula

$$= 6 \times CH_2O$$

$$= C_6H_{12}O_6$$

35. (a) Given that density of solution = 3.12 g mL<sup>-1</sup>

Volume of solution = 1.5 mL

For a solution,

Mass = volume × density

$$= 1.5 \text{ mL} \times 3.12 \text{ gm L}^{-1} = 4.68 \text{ g}$$

Hence, the answer is reported as 4.7 g.

36. (c)  $M = \frac{w}{GMW} \times \frac{1000}{V \text{ in ml}}$

N = M × Basicity of an acid

37. (c)  $w = \frac{N \times GEW \times V \text{ (in ml)}}{1000}$

38. (d) W = N × G.Ew × V (In L)

$$\% \text{ Purity of NaOH} = \frac{40}{50} \times 100$$

$$= 80 \%$$

39. (a) According to the law of conservation of mass,  
Total mass of reactants = Total mass of products  
Amount of  $\text{Fe}_2\text{O}_3$  is decided by limiting reagent.

$$\begin{aligned} &= \frac{24800}{267.84} \\ &= 92.6 \text{ g} \end{aligned}$$

40. (b) The element, carbon, combines with oxygen to form two compounds, i.e., carbon dioxide and carbon monoxide in  $\text{CO}_2$ , 12 parts by mass of carbon combine with 32 parts by mass of oxygen while in  $\text{CO}$ , 12 parts by mass of carbon combine with 16 parts by mass of oxygen.

Therefore, the masses of oxygen combine with a fixed mass of carbon (12 parts) in  $\text{CO}_2$  and  $\text{CO}$  are 32 and 16 respectively. These masses of oxygen have ratio of 32 : 16 or 2 : 1 to each other.

This is an example of law of multiple proportion.

## Multi-Concept Questions

1. (a)  $\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightleftharpoons 2\text{NH}_{3(g)}$

1 L of  $\text{N}_2$  reacts with 3 L of  $\text{H}_2$  to form 2 L of  $\text{NH}_3$ .  
So,  $\text{N}_2$  is the limiting reagent here because when 30L of  $\text{H}_2$  will be consumed, the volume of  $\text{N}_2$  consumed will be  $\frac{1}{3}$  i.e.,  $\frac{1}{3} \times 30 = 10\text{L}$ .

Since actual yield is 50% of the expected value,  $\text{NH}_3$  formed = 10 L,  $\text{N}_2$  reacted = 5 L and  $\text{H}_2$  reacted 15 L.  
So, the final mixture contains 10 L  $\text{NH}_3$ , 25 L  $\text{N}_2$  and 15 L  $\text{H}_2$ .

2. (b)  $3\text{NaBH}_4 + 4\text{BF}_3 \longrightarrow 3\text{NaBF}_4 + 2\text{B}_2\text{H}_6$

Since  $\text{BF}_3$  is in excess, the limiting reagent is  $\text{NaBH}_4$ .

To obtain 2 mole  $\text{B}_2\text{H}_6$ ,  $\text{NaBH}_4$  required = 3 mole

To obtain 0.200 mole  $\text{B}_2\text{H}_6$ ,  $\text{NaBH}_4$  required =  $\frac{3}{2} \times 0.200$   
= 0.300 mole

Because, the yield is 70%, Hence

$$\begin{aligned} x \times \frac{70}{100} &= 0.300 \\ x &= \frac{0.300}{100} \times \frac{100}{70} = \frac{3}{7} = 0.429 \text{ moles} \end{aligned}$$

3. (a)  $\text{Ag}_2\text{S} \rightarrow 2\text{Ag} + \text{S}$

To obtain 2 mole Ag, mole of  $\text{Ag}_2\text{S}$  required = 1

To obtain  $\frac{1}{108}$  mole Ag, mole of  $\text{Ag}_2\text{S}$  required  
=  $\frac{1}{2} \times \frac{1}{108} = \frac{1}{216}$  mole

grams of  $\text{Ag}_2\text{S}$  required =  $\frac{1}{216} \times 248 \text{ g}$

1.24 g  $\text{Ag}_2\text{S}$  is obtained from ore = 100 g

$\frac{248}{216}$  g  $\text{Ag}_2\text{S}$  is obtained from ore =  $\frac{100}{1.24} \times \frac{248}{216}$

4. (b,c)  $\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

0.1 mol of NaOH give =  $\frac{1}{2} \times 0.1 = 0.05$  mole

$$n = \frac{\text{wt}}{\text{m.wt}}$$

$$\text{wt} = 7.10 \text{ g}$$

$$M = \frac{n}{\text{vol. of solution}} = \frac{0.05}{2}$$

$$\text{aM} = 0.025 \text{ mol}$$

5. (a) C : H : N = 9 : 1 : 3.5

$$\therefore \text{mole ratio} = \text{C} : \text{H} : \text{N} = \frac{9}{12} : \frac{1}{1} : \frac{3.5}{14}$$

$$= 3 : 4 : 1$$

$$(\text{C}_3\text{H}_4\text{N})_x \Rightarrow x = 2 \text{ \& } \text{C}_6\text{H}_8\text{N}_2$$

6. (b)  $[\text{urea}] = \frac{6.02 \times 10^{20}}{6.02 \times 10^{23}} = 10^{-3} \text{ mol}$

$$\therefore [\text{urea}] = \frac{10^{-3}}{0.1} = 0.01 \text{ M}$$

7. (d)  $\text{Mn} = x \text{ gm} = \frac{x}{55} = 0.018x$

$$\text{O} = x \text{ gm} = \frac{x}{16} = 0.0625x$$

$$\frac{0.018x}{0.018x} = 1 \Rightarrow \frac{0.0625x}{0.018x} \approx 3.5$$

$$\text{Mn}_1\text{O}_{3.5} \Rightarrow \text{Mn}_2\text{O}_7$$

8. (b)  $\text{M} + \text{H}_2\text{SO}_4 \rightarrow \text{MSO}_4 + \text{H}_2$

$$\frac{\text{Mole of M}}{1} = \frac{\text{Mole of H}_2\text{SO}_4}{1}$$

$$\frac{1}{a} = \frac{4.08}{98}$$

$$a = \frac{98}{4.08} = 24.01$$

Thus atomic weight of M = 24 g.

9. (a) Let molar mass of compound = y g  
% by wt of C = 36

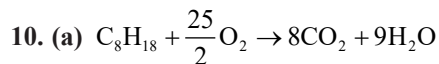
$$\text{So, } \frac{24}{y} \times 100 = 36$$

$$\frac{2400}{36} = y$$

$$y = 66.6 \text{ g}$$

So, 66.6 g has moles = 1

$$10 \text{ g has moles} = \frac{1}{66.6} \times 10 = 0.15$$



$$\text{Moles of CO}_2 \text{ formed} = \frac{7.04}{44} \text{ moles} = 0.16$$

now, from equation

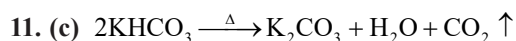
Moles of  $\text{H}_2\text{O}$  formed when 8 moles of  $\text{CO}_2$  react = 9

$$\text{Moles of H}_2\text{O formed when } \frac{7.04}{44} \text{ moles of CO}_2 \text{ react}$$

$$= \frac{9}{8} \times \frac{7.04}{44}$$

$$= \frac{63.36}{8 \times 44} = 0.18 \text{ moles}$$

$$\text{wt. of H}_2\text{O formed} = 0.18 \times 18 = 3.24 \text{ g}$$



Loss of wt. will be because of  $\text{CO}_2$  escaped

Total  $\text{KHCO}_3$  chosen = 1.50 g

percentage purity = 80%

$$\therefore \text{Pure KHCO}_3 = 1.50 \times \frac{80}{100} = 1.2 \text{ g}$$

$$\text{M. mass of KHCO}_3 = 39 + 1 + 12 + 3 \times 16 = 100 \text{ g}$$

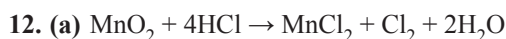
$$\text{moles of pure KHCO}_3 = \frac{1.2}{100} = 0.012 \text{ moles}$$

From balanced equation-

2 moles of  $\text{KHCO}_3$  yield moles of  $\text{CO}_2$  = 1

$$0.012 \text{ moles of KHCO}_3 \text{ yield moles of CO}_2 = \frac{1}{2} \times 0.012 = 0.006 \text{ moles}$$

$$\text{wt. of CO}_2 \text{ formed} = 0.264 \text{ g}$$



From balanced equation,

71 gm  $\text{Cl}_2$  is produced from  $\text{HCl} = 4 \times 36.5 \text{ g}$

$$2.5 \text{ gm Cl}_2 \text{ is produced from HCl} = \frac{4 \times 36.4 \times 2.5}{71} = 5.14 \text{ g}$$

Now,  $\text{HCl}$  is 36% by mass, which means-

36 g  $\text{HCl}$  is obtained from  $\text{HCl}$  solution = 100 g

$$5.14 \text{ g HCl is obtained from HCl solution} = \frac{100 \times 5.14}{36} = 14.27 \text{ g}$$



29.2% (w/w) means that 29.2 g of  $\text{HCl}$  is present in 100 gms of solution

$$\text{So, } \rho (\text{density of solution}) = \frac{\text{wt. of soln.}}{\text{vol. of soln.}}$$

$$1.25 \text{ g/mL} = \frac{100}{\text{vol. of soln.}}$$

$$v = \frac{100}{1.25} \text{ mL}$$

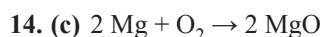
$$\text{molarity of solution} = \frac{\text{no. of moles of solute}}{\text{vol. of solution (in ltrs)}}$$

$$M = \frac{29.2 / 36.5}{100 / 1.25} \times 1000 = 10 \text{ M}$$

$$\text{Apply, } M_1 V_1 = M_2 V_2$$

$$0.4 \times 200 = 10 \times V$$

$$V = 8 \text{ mL}$$



$$2 \times 24 \text{ g Mg reacts with O}_2 = 32 \text{ g}$$

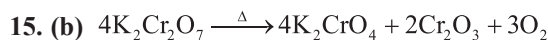
$$30 \text{ g Mg reacts with O}_2 = \frac{32}{2 \times 24} \times 30 = 20 \text{ g}$$

So, 10 g  $\text{O}_2$  will be left unreacted

$\text{Mg}$  is the limiting reagent

$$2 \times 24 \text{ g Mg forms MgO} = 2 \times 40 \text{ g}$$

$$30 \text{ g Mg forms MgO} = \frac{2 \times 40}{2 \times 24} \times 30 = 50 \text{ g}$$



$$\begin{array}{ccc} \text{mole} & 4 & 3 \text{ (100\% yield)} \\ & & = 1 \text{ (for 33.33\%)} \end{array}$$

$$\text{Volume of O}_2 \text{ gas produced} = 1 \times 22.4 = 22.4 \text{ L}$$

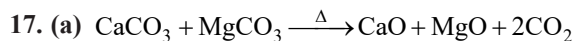


$$n_{\text{NaOH}} = 1$$

$$\therefore \text{CO}_2 \text{ present in mixture} = 0.5 \text{ and Co present} = 0.3 \text{ mole}$$

When more  $\text{CO}_2$  produced = 0.3, more  $\text{NaOH}$  required

$$= 0.3 \times 2 = 0.6 \text{ mole}$$



Let the mass of  $\text{CaCO}_3$  = x g

Then, mass of  $\text{MgCO}_3$  = (3.68 - x)g

$$\text{moles of CaCO}_3 = \frac{x}{100}$$

$$\text{moles of MgCO}_3 = \frac{3.68 - x}{84}$$

Applying POAC for C-atoms

$$\frac{x}{100} + \frac{3.68 - x}{84} = 0.04$$

$$x = 2$$

$$\therefore n_{\text{CaCO}_3} = \frac{2}{100} = 0.02 \text{ and } n_{\text{MgCO}_3} = \frac{1.68}{84} = 0.02$$

$$\text{mole\% of CaCO}_3 = \frac{0.02}{0.04} \times 100 = 50\%$$

$$\text{mole\% of MgCO}_3 = \frac{0.02}{0.04} \times 100 = 50\%$$

18. (c) Let relative abundance of heavier isotope be x %

$$A = \frac{(100-x)(A-1) + x(A+3)}{100}$$

$$100A = 100A - xA - 100 + x + 3x + xA$$

$$4x = 100$$

$$\therefore x = 25.$$

19. (a,c) Using PV = nRT,  $0.3 \times 125 = \frac{42}{M} \times R \times 300$   
 $\therefore M = 28 \text{ (N}_2\text{/CO)}$

20. (d) Only single solution have all these

Means 100 ml solution have 5.85 gm NaCl = 0.1 mole

and 5.55 gm CaCl<sub>2</sub> = 0.05 mole

$$[\text{Cl}^-] = \frac{(0.1 + 0.05 \times 2) \times 1000}{100} = 2 \text{ M}$$

$$\Rightarrow [\text{Na}^+] = \frac{(0.1 + 0.15) \times 1000}{100} = 2.5 \text{ M}$$

$$[\text{Ca}^{2+}] = \frac{0.5}{100} \times 1000 = 0.5 \text{ M} \Rightarrow [\text{OH}^-] = 1.5 \text{ M}$$

21. (b) Moles of Fe =  $\frac{0.0056}{56} = 10^{-4}$

1 mol of alum = 2 mol of Fe

2 mol of Fe = 1 mol of alum

$$10^{-4} \text{ mol of Fe} = \frac{1}{2} \times 10^{-4} \text{ mol of alum}$$

$$= 0.5 \times 10^{-4} \text{ mol of alum}$$

22. (d) (i) 14 g (ii) 40 g

$$(iii) \frac{108}{6.022 \times 10^{23}} = 1.79 \times 10^{-22} \text{ g}$$

(iv) 32 g (v) 1.99 g (vi) 1 g

Hence, the correct order of increasing masses is

(iii) < (vi) < (v) < (i) < (iv) < (ii)

23. (a)  $\text{H}_{2(g)} + \text{Cl}_{2(g)} \rightarrow 2\text{HCl}_{(g)}$

$$112 \text{ L} = \frac{112}{22.4} \text{ moles} \quad 213 \text{ g} = \frac{213}{71}$$

$$= 5 \text{ moles}$$

$$= 3 \text{ moles}$$

Here, Cl<sub>2(g)</sub> is limiting reagent,

1 Mole Cl<sub>2(g)</sub> produces HCl<sub>(g)</sub>

$$= 2 \times 6.022 \times 10^{23} \text{ molecules}$$

3 Moles Cl<sub>2(g)</sub> produces HCl<sub>(g)</sub>

$$= 3 \times 2 \times 6.022 \times 10^{23} \text{ molecules}$$

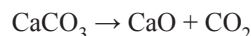
$$= 3.61 \times 10^{24} \text{ molecules}$$

24. (c)  $\text{MgO} + \text{CO}_2 \rightarrow \text{MgCO}_3$

$$40 \text{ g} \quad 44 \text{ g}$$

$$40 \text{ g MgO needs CO}_2 = 44 \text{ g}$$

$$30 \text{ g MgO needs CO}_2 = \frac{44 \times 30}{40} = 33 \text{ g}$$



$$100 \text{ g} \quad 44 \text{ g}$$

$$44 \text{ g CO}_2 \text{ is obtained from CaCO}_3 = 100 \text{ g}$$

$$33 \text{ g CO}_2 \text{ is obtained from CaCO}_3$$

$$= \frac{100 \times 33}{44} = 75 \text{ g}$$

Percentage purity of CaCO<sub>3</sub> sample

$$= \frac{75}{85} \times 100 = 88.24\%$$

## NEET Past 10 Year Questions

### 1. (c) NCERT (XI) Ch - 1, Pg. 15

$$(a) \text{ Number of Mg atoms} = \frac{1}{24} \times N_A$$

$$= \frac{1}{24} \times 6.022 \times 10^{23} \text{ atom}$$

$$(b) \text{ Number of O atoms} = \frac{1}{32} \times N_A$$

$$= \frac{1}{32} \times 2 \times 6.022 \times 10^{23} \text{ atom}$$

$$(c) \text{ Number of Li atoms} = \frac{1}{7} \times N_A$$

$$= \frac{1}{7} \times 6.022 \times 10^{23} \text{ atom}$$

$$(d) \text{ Number of Ag atoms} = \frac{1}{108} \times N_A$$

$$= \frac{1}{108} \times 6.022 \times 10^{23} \text{ atom}$$

Hence, 1g lithium has the largest number of atoms.

### 2. (c) NCERT (XI) Ch - 1, Pg. 15

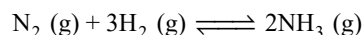
$$\text{No of atom in 12 g carbon} = 12 \div (1.9926 \times 10^{-23})$$

$$= 6.022 \times 10^{23} \text{ atoms}$$

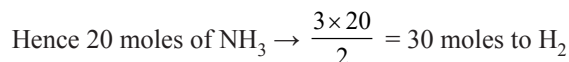
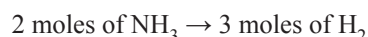
$$\text{Thus Number of atoms in 1 mole carbon} = 6.022 \times 10^{23} \text{ atoms}$$

3. (c) NCERT (XI) Ch - 1, Pg. 18

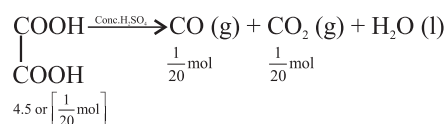
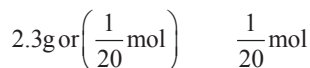
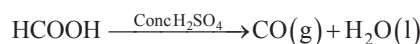
Haber's process



20 moles need to be produced



4. (d) NCERT (XI) Ch - 1, Pg. 18



Gaseous mixture formed is CO and CO<sub>2</sub>. When it is passed through KOH, only CO<sub>2</sub> is absorbed. So the remaining gas is CO.

So, weight of remaining gaseous product CO is

$$\frac{2}{20} \times 28 = 2.8\text{g}$$

So, the correct option is (d)

5. (a) NCERT (XI) Ch - 1, Pg. 18

(a) Mass of water = 18 × 1 = 18 g

$$\begin{aligned} \text{Molecules of water} &= \text{mole} \times N_A = \frac{18}{18} N_A \\ &= 1 N_A \end{aligned}$$

$$\begin{aligned} \text{(b) Molecules of water} &= \text{mole} \times N_A = \frac{0.18}{18} N_A \\ &= 10^{-2} N_A \end{aligned}$$

$$\text{(c) Molecules of water} = \text{mole} \times N_A = 10^{-3} N_A$$

$$\text{(d) Moles of water} = \frac{0.00224}{22.4} = 10^{-4}$$

$$\text{Molecules of water} = \text{mole} \times N_A = 10^{-4} N_A$$

6. (c) NCERT (XI) Ch -1, Pg. 16

%	Moles	Relative moles	
C	85.7	$\frac{85.7}{12} = 7.14$	1
H	14.3	$\frac{14.3}{1} = 14.3$	2

Hence, empirical formula = CH<sub>2</sub>.  
empirical weight = 14

$$\frac{3.01 \times 10^{20}}{6.022 \times 10^{23}} = \text{No. of moles} = \frac{42 \times 10^{-3}}{M}$$

$$\frac{1}{2} \times 10^{-3} = \frac{42 \times 10^{-3}}{M}$$

$$M = 84$$

$$\therefore \text{Atomicity} = \frac{84}{14} = 6$$

$$\text{Molecular formula} = \text{C}_6\text{H}_{12}$$

7. (c) NCERT (XI) Ch - 1, Pg. 20

For XY<sub>2</sub>, let atomic weight of X = Ax

and of Y = Ay

$$\text{So, } n_{\text{XY}_2} = 0.1 = \frac{10}{Ax + 2Ay}$$

$$Ax + 2Ay = 100 \quad \text{---- (1)}$$

Similarly for X<sub>3</sub>Y<sub>2</sub>,

$$3Ax + 2Ay = 180 \quad \text{----(2)}$$

On solving (1) and (2)

$$Ax = 40 \text{ and } Ay = 30$$

8. (a) NCERT (XI) Ch - 1, Pg. 15

(a) 18 moles of water will contain

$$= 18 \times 6.022 \times 10^{23} \text{ molecules of } \text{H}_2\text{O}$$

(b) 18 molecules

$$\text{(c) } \frac{1.8}{18} = 0.1 \text{ mole will contain}$$

$$= 0.1 \times 6.022 \times 10^{23} \text{ molecules of } \text{H}_2\text{O}$$

$$\text{(d) } \frac{18}{18} \text{ g} = 1 \text{ mole} = 1 \times 6.022 \times 10^{23} \text{ molecules of } \text{H}_2\text{O}$$

So, maximum number of molecules is present in 18 moles of H<sub>2</sub>O.

9. (c) Avogadro's number 6.022 × 10<sup>23</sup> is ideally the mass of number of atoms present in 1 mole that is 12 grams of C. If we change the Avogadro's number it will directly change the mass of 1 mole that is 12 g of C.

10. (b) NCERT (XI) Ch - 1, Pg. 19

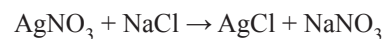
Molecular weight of AgNO<sub>3</sub> = 170

Molecular weight of NaCl = 58.5

1. 16.9% solution of AgNO<sub>3</sub> means 16.9 g of AgNO<sub>3</sub> in 100 mL of solution

so, 8.45 g of AgNO<sub>3</sub> in 50 mL of solution.

2. 5.8% solution of NaCl means 5.8 g of NaCl is in 100 mL solution. So, in 50 mL = 2.9 g NaCl



$$\text{Initial Mole: } \frac{8.45}{170} \quad \frac{2.9}{58.5} \quad 0 \quad 0$$

$$= 0.049 \quad = 0.049 \quad 0 \quad 0$$

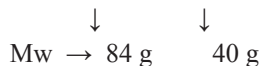
$$\text{Final mole: } 0 \quad 0 \quad 0.049 \quad 0.049$$

$$\text{Mass of AgCl precipitated} = 0.049 \text{ mole}$$

$$= 0.049 \times 143.3$$

$$= 7.02 \text{ gm} \approx 7 \text{ gm}$$

## 11. (c) NCERT (XI) Ch - 10, Pg. 301



According to question

84 g  $\text{MgCO}_3$  gives = 40 g  $\text{MgO}$ 

$$1 \text{ g } \text{MgCO}_3 \text{ gives} = \frac{40}{84}$$

$$20 \text{ g } \text{MgCO}_3 \text{ gives} = \frac{40}{84} \times 20$$

$$= 9.52 \text{ g of MgO}$$

But according to question

yield of  $\text{MgO}$  is = 8 g

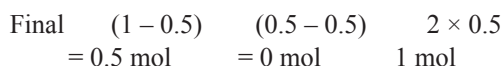
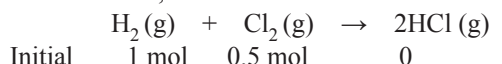
$$\% \text{ purity} = \frac{8}{9.52} \times 100 = 84\%$$

## 12. (d) NCERT (XI) Ch - 1, Pg. 19

1 mole = 22.4 litres at S.T.P.

$$n_{\text{H}_2} = \frac{22.4}{22.4} = 1 \text{ mol}; n_{\text{Cl}_2} = \frac{11.2}{22.4} = 0.5 \text{ mol}$$

Reaction is as,

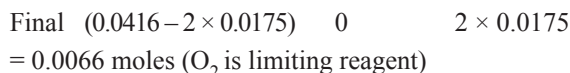
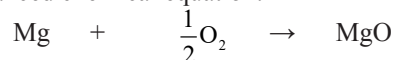
Here,  $\text{Cl}_2$  is limiting reagent. So, 1 mole of  $\text{HCl}$  (g) is formed.

## 13. (d) NCERT (XI) Ch - 1

$$n_{\text{Mg}} = \frac{1}{24} = 0.0416 \text{ moles}$$

$$n_{\text{O}_2} = \frac{0.56}{32} = 0.0175 \text{ moles}$$

The balanced chemical equation:



$$\therefore \text{Mass of Mg left in excess} = 0.0066 \times 24 = 0.16 \text{ g}$$

## 14. (c) NCERT (XI) Ch - 1, Pg. 15

According to Avogadro's principle, ratio of volume of gases will be equal to the ratio of their number of moles

$$\text{mole} = \frac{w}{M_w}$$

$$n_{\text{H}_2} : n_{\text{O}_2} : n_{\text{CH}_4}$$

$$\frac{w}{2} : \frac{w}{32} : \frac{w}{16} \Rightarrow 16 : 1 : 2$$

## 15. (b) NCERT (XI) Ch - 1, Pg. 15 &amp; 20

$$6.02 \times 10^{23} \text{ number of molecules} = 1 \text{ mole}$$

$$6.02 \times 10^{20} = 0.001 \text{ mole}$$

$$\text{Concentration} = \frac{\text{mole}}{V(\text{mL})} \times 1000$$

$$= \frac{0.001}{100} \times 1000$$

$$\Rightarrow 0.01 \text{ M}$$

16. (a)  $\text{AgNO}_3$  (excess) +  $[\text{Cr}(\text{H}_2\text{O})_4]\text{Cl}_2$ 

$$\text{Moles} = M \times V(\text{lit})$$

$$0.01 \times \frac{100}{1000} = 0.001$$

## 17. (a) NCERT (XI) Ch , 1 Pg. 20

$$\text{Molarity} = \frac{W \times 1000}{\text{Mol. wt.} \times V_{\text{sol}}(\text{mL})} \Rightarrow 2 = \frac{W}{63} \times \frac{1000}{250}$$

$$W = \frac{63}{2} \text{ g}$$

$$\text{Mass of acid} \times \frac{70}{100} = \frac{63}{2}$$

$$\text{Mass of acid} = 45 \text{ g}$$

## 18. (a) NCERT (XI) Ch - 1, Pg. 15

$$64 \text{ g of SO}_2 = 1 \text{ mole} = N_A \text{ number of molecules}$$

$$8 \text{ g of H}_2 = 4 \text{ moles} = 4 \times N_A \text{ number of molecules}$$

$$48 \text{ g of O}_3 = 1 \text{ mole} = N_A \text{ number of molecules}$$

$$44 \text{ g of CO}_2 = 1 \text{ mole} = N_A \text{ number of molecules}$$

So, 8 g of  $\text{H}_2$  has maximum number of molecules.

# ABOUT PHYSICS WALLAH



Alakh Pandey is one of the most renowned faculty in NEET & JEE domain's Physics. On his YouTube channel, Physics Wallah, he teaches the Science courses of 11th and 12th standard to the students aiming to appear for the engineering and medical entrance exams.



YouTube

PW  
Alakh  
Pandey



**Scan the QR Code**  
to download our app  
**PHYSICS WALLAH**



- [www.physicswallahalakhpandey.com](http://www.physicswallahalakhpandey.com) | [www.physicswallah.live](http://www.physicswallah.live)



- Physics Wallah |



- Physics Wallah - Alakh Pandey