NEET ANSWER KEY & SOLUTIONS

SUBJECT :- CHEMISTRY

CLASS :- 11^{th} **PAPER CODE :- CWT-1**

CHAPTER :- MOLE CONCEPT

ANSWER KEY

1.	(A)	**2.**	(C)	**3.**	(B)	**4.**	(B)	**5.**	(A)	**6.**	(A)	**7.**	(B)
8.	(B)	**9.**	(D)	**10.**	(A)	**11.**	(A)	**12.**	(C)	**13.**	(B)	**14.**	(D)
15.	(B)	**16.**	(A)	**17.**	(C)	**18.**	(B)	**19.**	(B)	**20.**	(A)	**21.**	(B)
22.	(B)	**23.**	(A)	**24.**	(B)	**25.**	(C)	**26.**	(B)	**27.**	(D)	**28.**	(B)
29.	(A)	**30.**	(A)	**31.**	(A)	**32.**	(A)	**33.**	(A)	**34.**	(A)	**35.**	(A)
36.	(D)	**37.**	(C)	**38.**	(C)	**39.**	(A)	**40.**	(B)	**41.**	(B)	**42.**	(B)
43.	(A)	**44.**	(D)	**45.**	(C)	**46.**	(A)	**47.**	(C)	**48.**	(B)	**49.**	(A)
50.	(A)												

SOLUTIONS

SECTION-A

1. (A)

Sol. This is the required relation in Centigrade and Fahrenheit scales.

2. (C)

Sol. Theory based

3. (B)

Sol. Molecular weight of $SO_2 = 32+16 \times 2$
$= 64$ amu

4. (B)

Sol. $\text{mole} = \dfrac{\text{mass}}{\text{at. wt.}} = \dfrac{46}{23} = 2$ mole.

5. (A)

Sol. We know that, 1 amu $= \dfrac{1}{12} \times$ weight of one ^{12}C atom or weight of one ^{12}C atom = 12 amu (at. wt. of C = 12 amu).
Similarly, as the atomic weight of He is 4 amu, weight of one He atom = 4 amu.
Thus, the number of atoms in 100 amu of He $= \dfrac{100}{4} = 25$.

6. (A)

Sol. In 18 g, no. of molecules = N_A

so in 0.09 g no. of molecules $= \dfrac{N_A}{18} \times 0.09$

$= \dfrac{N_A}{2 \times 100} = 3.01 \times 10^{21}$.

7. (B)

Sol. $\text{mole} = \dfrac{w}{m} = \dfrac{1}{m}$

for largest no. of molecule m should be lowest.

8. (B)

Sol. molecule of $H_2SO_4 = \dfrac{196}{98} = 2$.

Hence : H = 4 atoms, S = 2 atoms, O = 8 atoms.

9. (D)

Sol. 1 mole P_4 = N molecules of P_4 = 4 N atoms of P_4.

10. (A)

Sol. (1) moles of C = 24/12 = 2, So no. of atoms = $2N_A$
(2) moles of Fe = 56/56 = 1, So no. of atoms = N_A
(3) moles of Al = 27/27 = 1, So no. of atoms = N_A
(4) moles of Fe = 108/108 = 1, So no. of atoms = N_A

11. (A)

Sol. 12 g $_6C^{12}$ contains $6N_A$ electrons and 6 N_A neutrons.

12. (C)

Sol. Mole of Aluminium $= \dfrac{54}{27} = 2$ mole.

Al and Mg have same number of atoms (given). Hence same moles also.
$\therefore$ Mass of magnesium = 2 × 24 = 48 g.

13. (B)

Sol. $\dfrac{1}{2} \times 6.023 \times 10^{23} = 3.0125 \times 10^{23}$

14. (D)

Sol. 9.108×10^{-31} kg is the wt. of 1 e^- = moles of e^- So 1 kg is the wt. of 1 e^-

$= \dfrac{1}{9.108 \times 10^{-31}} \times \dfrac{1}{N_A}$

$= \dfrac{1}{9.108 \times 10^{-31} \times 6.023 \times 10^{23}}$

$= \dfrac{10^8}{9.108 \times 6.023}$.

15. (B)

Sol. Mol. wt. of gas is $= \frac{16 \times 22.4}{5.6} = 64$ g

$32 + 16x = 64$

$x = 2$

16. (A)

Sol. Number of electrons $= \frac{1.8 \times 10}{18} \times N_A$

17. (C)

Sol. $2\,Al + \frac{3}{2}\,O_2 \longrightarrow Al_2O_3$

$\Rightarrow$ weight of Al required $= 2 \times 27 = 54$ g

18. (B)

Sol. $KClO_3 \quad KCl + \frac{3}{2}\,O_2$

$\frac{3}{2}$ mole or 33.6 litre O_2 from 1 mole $KClO_3$

11.2 litre of O_2 formed by $\frac{1}{3}$ mole $KClO_3$

19. (B)

Sol. By applying POAC for C atoms

moles of ethylene × 2 = mole of polythene × n × 2

$\frac{100g}{28} \times 2 = \frac{\text{wt. of polethene}}{28 \times n} \times n \times 2$

wt. of polyethene = 100 g

20. (A)

Sol. $Zn + Fe + 2S \longrightarrow Zn\,(FeS_2)$

	Zn	Fe	2S	Zn (FeS$_2$)
initial mole	2	3	5	0
final mole	0	3–2 = 1	5 –4 =1	2

$Zn + Fe + 2S \longrightarrow Zn\,(FeS_2)$

21. (B)

Sol. Molarity $= \frac{6.02 \times 10^{22}}{6.02 \times 10^{23}} \times \frac{1}{1/2} = 0.2$

22. (B)

Sol. Mole = M × V

$100 \times 10^{-3} = 0.8 \times V$

$V = 0.125$

23. (A)

Sol. Molarity has volume term in its expression and volume is temperature dependent.

24. (B)

Sol. 1000 mL solution contain 2 mole of ethanol or 1000 × 1.025 g solution contain 2 mole of ethanol

wt. of solvent = 1000 × 1.025 – 2 × 46

$m = \frac{2}{1000 \times 1.025 - 2 \times 46} \times 1000$

$m = \frac{2}{933} \times 1000 = 2.143$

25. (C)

Sol. $M_1V_1 + M_2V_2 = M_R\,[V_1 + V_2]$

$1 \times 500 + 3 \times 500 = M_R\,[500 + 500]$

$M_R = 1$

26. (B)

Sol. Weight of NaOH = 20 gram

Weight of solvent = 80 g

$M = \frac{20 \times 1000}{40 \times 80} = 6.25$ m

27. (D)

Sol. $2(+1) + 2\ x = 0$

$\therefore \quad x = -1$

28. (B)

Sol. $SO_3^{2-} \Rightarrow 1(x) + 3(-2) = -2 \therefore x = +4$

$S_2O_4^{2-} \Rightarrow 2\,(x) + 4\,(-2) = -2 \therefore x = +3$

$S_2O_6^{2-} \Rightarrow 2\,(x) + 6\,(-2) = -2 \therefore x = +5$

29. (A)

Sol. $NaN_3 \Rightarrow 1(+1) + 3(x) = 0 \therefore x = -1/3$

$N_2H_2 \Rightarrow 2(x) + 2(+1) = 0 \therefore x = -1$

$NO \Rightarrow 1(x) + 1(-2) = 0 \therefore x = +2$

$N_2O_5 \Rightarrow 2(x) + 5(-2) = 0 \therefore x = +5$

30. (A)

Sol. 10 mole NH_3 have mole of 'H' atom = 10 × 3

5 mole of H_2SO_4 have mole of 'H' atom = 10

Total mole of 'H' atom = 40

mole of H_2 = 20

Hence : number of H_2 molecules = $20N_A$

31. (A)

Sol. 1 litre Hg metal

volume = 1000

$d = \frac{m}{v}$ mass = d × V = 13.6 × 1000

No of mole of Hg metal $= \frac{13.6 \times 1000}{200} =$ 68 mole

32. (A)

Sol.

	C	H	O	
mass	24	8	32	
moles	$\frac{24}{12}$	$\frac{8}{1}$	$\frac{32}{16}$	
ratio		2	8	2
Simple integer ratio		1	4	1

Hence empirical formula is CH_4O

33. (A)

Sol. $I_2 + 2ICl_2 \longrightarrow ICl + ICl_3$

Given mass 25.4 gram 14.2 gram 0 0

initial mole 0.1 mole 0.2 mole 0 0

final mole 0 0 0.1 0.1

34. (A)

Sol. $2SO_2 + O_2 \longrightarrow 2SO_3$

Initial mole 10 15 0

Final mole (10 – 2x) (15 – x) 2x

$\because$ Given 2x = 8

$\therefore$ x = 4

$\therefore$ Mole of SO_2 left = 10 – 2 × 4 = 2

Mole of O_2 left = 15 – 4 = 11

35. (A)

Sol. $H_2SO_4 + Ca(OH)_2 \longrightarrow CaSO_4 + 2H_2O$

Initial mole 0.5 0.2 0 0

finally mole 0.5 – 0.2 0 0.2 0.4

SECTION-B

36. (D)

Sol. 500 gm toothpaste contains 0.4 g fluoride

$\therefore 10^6$ g toothpaste will contain $\frac{0.4}{500} \times 10^6$

= 800 g fluoride

$\therefore$ ppm of fluoride = 800

37. (C)

Sol. $M_{final} = \frac{M_1V_1 + M_2V_2}{V_1 + V_2 + V_{water}}$; 0.25

$= \frac{0.6 \times 250 + 0.2 \times 750}{250 + 750 + V_{water}}$; So

V_{water} = 200 ml.

38. (C)

Sol. Moles of HNO_3 required = $\frac{0.784}{108}$ = 0.0072

$\times \frac{4}{3}$ = 0.00968.

Vol. of HNO_3 = $\frac{0.00963}{1.15} \times 1000$ = 8.41 ml.

39. (A)

Sol. Molarity = $\frac{10 \times 1.8 \times 98}{98}$ = 18 M

40. (B)

Sol. Fe_3O_4 can be written as $FeO.Fe_2O_3$.

In FeO , Fe has oxidation state + 2 , in Fe_2O_3 has oxidation state + 3.

resultant oxidation number = $\frac{1 \times 2 + 2 \times 3}{3}$

$= \frac{8}{3}$.

41. (B)

Sol. **Data:-**

Element	Abundance	Atomic Mass
X^{200}	90%	200
X^{199}	8.0%	199
X^{202}	2.0%	202

Formula:-

Average atomic mass= [Atomic mass of X^{200} × abundance +

Atomic mass of X^{199} × abundance **+**

Atomic mass of X^{202} × abundance]/100

$= \frac{200 \times 90 + 199 \times 8 + 202 \times 2}{100}$

$= \frac{18000 + 1592 + 404}{100}$

$= 199.96 \approx 200u$

42. (B)

Sol. For XY_2 $n = \frac{w}{M}$

$0.1 = \frac{10}{X + 2Y}$

X + 2Y = 100 ....(1)

For X_3Y_2 $n = \frac{w}{M}$

$0.05 = \frac{9}{3X + 2Y}$

3X + 2Y = 180 ....(2)

Form (1) and (2)

2X = 80

X = 40 and 2Y = 100 - 40

= 60

= Y = 30

43. (A)

Sol. (i) 10^{-3} mole water = 6.02 x 10^{20} molecule H_2O

(ii) 18 ml H_2O = 18 gram = 1 mole

= 6.02 x 10^{23} molecule

(iii) At 1 atm & 273 K

No. of mole of H_2O = $\frac{0.00224}{22.4}$ = $\frac{22.4 \times 10^{-4}}{22.4}$

= 10^{-4} mole = 6.02 x 10^{19} molecule.

(iv) 0.18 gram H_2O = 0.1 mole = 6.02 x 10^{22} molecule.

44. (D)

Sol. Formation of ammonia

$N_2 + 3H_2 \longrightarrow 2NH_3$

2 mole of NH_3 is formed by 3 mole of H_2

20 mole of NH_3 is formed by 30 mole of H_2

45. (C)

Sol. $CaCl_2 + CO_3^{2-} \longrightarrow CaCO_3 + 2Cl^-$

111 g 100g

$CaCO_3 \longrightarrow CaO + CO_2$

100g 56 g

$\therefore$ 56 g CaO is obtained by the decomposition of $CaCO_3$

= 100 g

$\therefore$ 0.959 g CaO will be obtained by the decomposition of $CaCO_3$

$= \frac{100 \times 0.959}{56} = 1.71g$

Further, 100 g $CaCO_3$ = 111 g $CaCO_2$

171 g $CaCO_3$ = $\frac{111 \times 171}{100}$ = 189 g $CaCl_2$

Percentage of $CaCl_2$ in the mixture

$= \frac{189}{4.22} \times 100$

= 44.78 = 45%

46. (A)

Sol. $A + 2HCl \longrightarrow ACl_2 + H_2$

mole = $\frac{x}{15}$ $\frac{x}{15}$

$B + 2\,HCl \longrightarrow BCl_2 + H_2$

mole = $\frac{2-x}{30}$ $\frac{2-x}{30}$

Mole of H_2 = $\frac{x}{15} + \frac{2-x}{30} = \frac{2.24}{22.4} = \frac{1}{10}$

$\frac{x}{15} - \frac{x}{30} = \frac{1}{10} - \frac{1}{15}$

x = 1 gm

47. (C)

Sol. $X_{\text{ethyl alcohol}} = \frac{5.2}{5.2 + \frac{1000}{18}} = 0.086$

48. (B)

Sol. $\frac{n_{O_2}}{n_{N_2}} = \frac{\frac{(m_{O_2})}{(M_{O_2})}}{\frac{(m_{N_2})}{(M_{N_2})}} = \left(\frac{m_{O_2}}{m_{N_2}}\right)\frac{28}{32} = \frac{1}{4} \times \frac{28}{32} = \frac{7}{32}$

49. (A)

Sol. Theory based

50. (A)

Sol. One mole is the amount of a substance that contains as many particles as there are atoms in exactly 12 g of the carbon atom. So S.I. the system took mole as the seventh base fundamental quantity (symbol = mol)