Physics :

1. (1)
2. (4)
3. (4)
4. (2)
5. (1)
6. (1)
7. (2)
8. (4)
9. (1)
10. (3)
11. (2)
12. (3)
13. (4)
14. (4)
15. (1)
16. (1)
17. (3)
18. (2)
19. (2)
20. (4)
21. (4)
22. (4)
23. (2)
24. (2)
25. (3)
26. (3)
27. (1)
28. (1)
29. (1)
30. (4)

Chemistry :

31. Sol. (3)

$M_1V_1 + M_2V_2 = MV$

32. Sol. (1)

$M_1V_1 = M_2V_2$

$0.01 \times 19.85 = M_2 \times 20$

$M_2 = 0.009925$; $M = 0.0099$

33. Sol. (1)

Molecular weight of $C_2H_5OH = 24 + 5 + 16 + 1 = 46$

Molecular mass of $H_2O = 18$

414*g* of C_2H_5OH has $\frac{414}{46} = 9$ *mole*

18*g* of H_2O has $= \frac{18}{18} = 1$ *mole*

Mole fraction of water $= \frac{n_1}{n_1 + n_2} = \frac{1}{1+9} = \frac{1}{10} = 0.1$

34. Sol. (3)

35. Sol. (2)

36. Sol. (2)

37. Sol. (4)

$NV = N_1V_1 + N_2V_2 + N_3V_3$

or, $1000\ N = 1 \times 5 + \frac{1}{2} \times 20 + \frac{1}{3} \times 30$ or $N = \frac{1}{40}$.

38. Sol. (4)

$W = \frac{N \times eq.wt. \times V(ml)}{1000} = \frac{0.05 \times 49.04 \times 100}{1000} = 0.2452.$

39. Sol. (3)

40. Sol. (1)

41. Sol. (4)

42. Sol. (2)

43. Sol. (3)

M. eq. of *HCl* = M. eq. of $CaCO_3$

$N \times 50 = \frac{1}{50} \times 1000$; $N = \frac{1 \times 1000}{50 \times 50} = 0.4\,N$

44. Sol. (3)

The density of solution $= 1.8\ gm/ml$

Weight of one litre of solution $= 1800\ gm$

$\therefore$ Weight of H_2SO_4 in the solution $= \frac{1800 \times 90}{100}$ =162*gm*

$\therefore$ Weight of solvent $= 1800 - 1620 = 180\ gm$

$\therefore$ Molality $= \frac{1620}{98} \times \frac{100}{180} = 9.18$

45. Sol. (2)

Mole of urea $= \frac{6.02 \times 10^{20}}{6.02 \times 10^{23}} = 10^{-3}$ moles

Conc. of solution (in molarity)

46. Sol. (4)

1000 *ml* of 1 *N* oxalic solution = 63 *g*

500 *ml* of 0.2 *N* oxalic acid solution

$= \frac{63}{1000} \times 500 \times 0.2 = 6.3\ g$.

47. Sol. (1)

48. Sol. (3)

Mole fraction of $CO_2 = \frac{n_{CO_2}}{n_{CO_2} + n_{N_2}} = \frac{\frac{44}{44}}{\frac{44}{44} + \frac{14}{28}} = \frac{2}{3}$.

49. Sol. (1)

50. Sol. (2)

51. Sol. (3)

wt. of metallic chloride $= 74.5$

wt. of chlorine = 35.5

$\therefore$ wt. of metal $= 74.5 - 35.5 = 39$

Equivalent weight of metal

$= \frac{\text{weight of metal}}{\text{weight of chlorine}} \times 35.5 = \frac{39}{35.5} \times 35.5 = 39$

52. Sol. (4)

$\because$ 17*gm* NH_3 contains 6×10^{23} molecules of NH_3

$\therefore$ 4.25*gm* NH_3 contains = $\frac{6 \times 10^{23}}{17} \times 4.25$

$\therefore$ No. of atoms $= \frac{6 \times 10^{23} \times 4.25}{17} \times 4 = 6 \times 10^{23}$.

53. Sol. (4)

54. Sol. (1)

6×10^{23} molecules has mass $= 18\ gm$

1 molecules has mass $= \frac{18}{6 \times 10^{23}} = 3 \times 10^{-23} gm$

$= 3 \times 10^{-26} kg$.

55. Sol. (1)

14 *gm* N^{3-} ions have $= 8N_A$ valence electrons

4.2*gm* of N^{3-} ions have $= \frac{8N_A \times 4.2}{14} = 2.4N_A$

56. Sol. (2)

The acid is dibasic.

Molecular weight of $H_3PO_3 = 3 + 31 + 48 = 82$

$\therefore$ Equivalent weight $= \frac{\text{Molecular weight}}{\text{Basicity}} = \frac{82}{2}$ = 41.

57. Sol. (2)

$\overset{+2}{Mn}SO_4 \rightarrow \overset{+4}{Mn}O_2$

Change of valency $= 4 - 2 = 2$

$\therefore$ Equivalent weight $= \frac{M}{2}$.

58. Sol. (1)

$\because$ 2.24*L* of gas has mass = 4.4*gm*

$\therefore$ 22.4*L* of gas has mass $= \frac{4.4}{2.24} \times 22.4 = 44$

So given gas is CO_2 because CO_2 has molecular mass=44.

59. Sol. (2)

$$N = \frac{10 \times \text{sp. gr. of the solution} \times \text{wt.\% of solute} \times \text{Mol.wt.}}{\text{Molecular wt. of solute} \times \text{Eq. wt.}}$$

$$N = \frac{10 \times 1.71 \times 80 \times 98}{98 \times 49} = 27.9$$

60. Sol. (1)

200*mg* of CO_2 = $200 \times 10^{-3} = 0.2gm$

44*gm* of CO_2 = 6×10^{23} molecules

0.2*gm* of CO_2 = $\frac{6 \times 10^{23}}{44} \times 0.2 = 0.0272 \times 10^{23}$

$= 2.72 \times 10^{21}$ molecule

Now 10^{21} molecule are removed.

So remaining molecules

$= 2.72 \times 10^{21} - 10^{21} = 10^{21}(2.72 - 1)$

$= 1.72 \times 10^{21}$ molecules

Now, 6.023×10^{23} molecules = 1mole

1.72×10^{21} molecules $= \frac{1 \times 1.72 \times 10^{21}}{6.023 \times 10^{23}} = 0.285 \times 10^{-2}$

$= 2.85 \times 10^{-3}$.

Maths :

61. (1)
62. (2)
63. (3)
64. (1)
65. (1)
66. (4)
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81. (3)
82. (1)
83. (4)
84. (1)
85. (2)
86. (2)
87. (1)
88. (4)
89. (3)
90. (1)