



SAFE HANDS & IIT-ian's PACE

EDT-09 (NEET) SOLUTIONS

1. (b)

$$\text{Sol. } \frac{P_1}{P_2} = \frac{\rho_1}{\rho_2} = \frac{m_1}{m_2}$$

$$m_2 = \frac{P_2}{P_1} \times m_1 = \frac{2.5 \times 10^6}{10^7} \times 10 = 2.5 \text{ kg}$$

$$\text{Mass of gas taken out} = 10 - 2.5 = 7.5 \text{ kg}$$

2. (a)

Sol. According to Charle's law, $V \propto T$

Therefore, graph is a straight line, Hence (a) is correct options.

3. (b)

$$\text{Sol. } V = \sqrt{\gamma P / \rho}$$

$$330 = \sqrt{\gamma \times \frac{1 \times 10^5}{1.3}}$$

$$\frac{(33)^2 \times 100 \times 1.3}{1 \times 10^5} = \gamma$$

$$\frac{1.089 \times 10^3 \times 10^2 \times 1.3}{1 \times 10^5} = \gamma$$

$$\frac{2}{f} + 1 = \gamma = 1.4 = 7/5$$

$$\frac{2}{f} = 2/5$$

$$f = 5$$

4. (c)

$$\text{Sol. } P = \rho \frac{RT}{M_w}$$

$$\frac{\rho}{P} = \frac{M_w}{RT}$$

$$\left(\frac{\rho}{P} \right)_{0^\circ\text{C}} = \frac{M_w}{R \times 273} = x$$



$$\left(\frac{\rho}{P}\right)_{100^\circ\text{C}} = \frac{M_w}{R \times 373} = \frac{273}{373} x$$

5. (c)

$$\text{Sol. } \gamma_{\text{mix}} = \frac{\mu_1 C_{p_1} + \mu_2 C_{p_2}}{\mu_1 C_{v_1} + \mu_2 C_{v_2}}$$

$$= \frac{\left(1 \times \frac{5}{2} R\right) + \left(2 \times \frac{7}{2} R\right)}{\left(1 \times \frac{3}{2} R\right) + \left(2 \times \frac{5}{2} R\right)} = \frac{19}{13}$$

6. (b)

Sol. Using, $P_1 = P_2 + \rho gh$

Here, $P_2 = 1.013 \times 10^5 \text{ atm}$, $h = 40 \text{ m}$

$\rho = 10^3 \text{ kg m}^{-3}$ (density of water), $g = 9.8 \text{ ms}^{-2}$

$$\therefore P_1 = 1.013 \times 10^5 + 10^3 \times 9.8 \times 40$$

$$= 493300 \text{ Pa}$$

$$\text{Now, } \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

Here, $T_1 = (12 + 273) = 285 \text{ K}$, $T_2 = (35 + 273) = 308 \text{ K}$

$$V_1 = 1 \times 10^{-6} \text{ m}^3$$

V_2 is the volume of the air bubble when it reaches the surface

$$\therefore V_2 = \frac{P_1 V_1 T_2}{T_1 P_2} = \frac{(493300 \times 1 \times 10^{-6})}{285 \times 1.013 \times 10^5} \times 308$$

$$= 5.26 \times 10^{-6} \text{ m}^3 = 5.3 \times 10^{-6} \text{ m}^3$$

7. (d)

Sol. At high temperature and low pressure the real gas behaves as an ideal gas.

8. (a)

Sol. Using, Dalton's law of partial pressures.

$$P = P_1 + P_2 + P_3 = \frac{nRT}{V} + \frac{nRT}{V} + \frac{nRT}{V}$$

$$= \frac{3nRT}{V} \quad \dots (i)$$



Here, $n = \frac{1}{2}$, $T = 27^\circ\text{C} = 27 + 273 = 30\text{K}$

$$V = 5 \times 10^{-3} \text{ cc.}$$

$$\therefore P = \frac{3 \times 8.31 \times 300}{2 \times 5 \times 10^{-3}}$$

$$P = 7.48 \times 10^5 \text{ Nm}^{-2}$$

9. (d)

Sol. According to ideal gas law

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \text{ or } T_2 = T_1 \frac{P_2 V_2}{P_1 V_1}$$

Here, $P_1 = P$, $V_1 = V$, $T_1 = T$

$$P_2 = 2P, V_2 = 2V, T_2 = ?$$

$$\therefore T_2 = \frac{T(2P)(2V)}{PV} = 4T$$

10. (b)

$$\text{Sol. rms speed } V_{\text{rms}} = \sqrt{\frac{V_1^2 + V_2^2 + V_3^2}{3}}$$

$$\sqrt{\frac{(0.5)^2 + (1)^2 + (2)^2}{3}} = 1.3228 \text{ kms}^{-1}$$

$$\text{Average speed } v_{\text{av}} = \frac{v_1 + v_2 + v_3}{3}$$

$$= \frac{0.5 + 1 + 2}{3} = 1.17 \text{ kms}^{-1}$$

$$= \frac{V_{\text{rms}}}{V_{\text{av}}} = \frac{1.3228}{1.17} = 1.1306 \cong 1.14$$

11. (c)

Sol. The helium molecule is monoatomic and hence its internal energy per molecule is $\frac{3}{2} k_B T$ (where k_B is

the Boltzmann, constant). The internal energy per mole is therefore is $\frac{3}{2} RT$. One gram of helium is one fourth

mole and hence its internal energy is $\frac{1}{4} \times \frac{3}{2} R \times 100 = 300\text{J}$, taking the value of R to be approximately $8\text{J mol}^{-1}\text{K}^{-1}$.



12. (d)

Sol. The kinetic energy of 1g molecule of a gas at temperature T.

$$= \frac{3}{2} RT = \frac{3}{2} \times 8.31 \times 273 = 3.4 \times 10^3 \text{ J}$$

13. (a)

Sol. Using, $P = \frac{1}{3} \rho v_{\text{rms}}^2 = \frac{1}{3} \frac{mN}{V} v_{\text{rms}}^2$

$$\therefore P \propto m v_{\text{rms}}^2$$

As m is halved v_{rms} is doubled P_0 becomes twice = $2P_0$

14. (a)

Sol. Pressure, $P = \frac{1}{3} \frac{M}{V} v_{\text{rms}}^2 = \frac{2}{3} E$

Here, $E = \frac{1}{2} M v_{\text{rms}}^2$ is total internal energy of the gas.

15. (b)

Sol. If the container is suddenly stopped loss in kinetic energy of gas = $\frac{1}{2} (mn)v_0^2$, where n is number of moles of gas

Let ΔT is the fall in temperature of gas.

$$\text{Then, } n \left(\frac{3}{2} R \Delta T \right) = \frac{1}{2} m v_0^2$$

$$\Delta T = \frac{m v_0^2}{3R}$$

16. (d)

Sol. Since there is no loss of energy in the process, therefore, sum of kinetic energy of gases A and B = Kinetic energy of mixture.

$$\text{Temperature of the mixture, } T = \frac{\mu_1 T_1 + \mu_2 T_2}{\mu_1 + \mu_2}$$

$$= \frac{2(27 + 273) + 3(37 + 273)}{2 + 3}$$

$$= \frac{600 + 930}{5} = \frac{1530}{5}$$

$$\therefore = 360\text{K} = 360 - 273 = 33^\circ\text{C}$$



17. (d)

Sol. Average kinetic energy per molecular of a gas

$$= \frac{3}{2}KT = \text{a constant at a given temperature}$$

18. (b)

Sol. $V_{\text{rms}} = \sqrt{\frac{3RT}{M}}$

Now, rms velocity of H_2 molecule = rms velocity of O_2 molecules

$$\sqrt{\frac{3R \times T}{2}} = \sqrt{\frac{3R \times (47 + 273)}{32}}$$

$$T = \frac{2 \times 320}{32} = 20\text{K}$$

19. (d)

Sol. Molecules of an ideal gas move randomly with different speeds.

20. (d)

Sol. $V_{\text{rms}} = \sqrt{\frac{3RT}{M}}$

$$\% \text{ increase in } V_{\text{rms}} = \frac{\sqrt{\frac{3/RT_2}{M}} - \sqrt{\frac{3RT_1}{M}}}{\sqrt{\frac{3RT_1}{M}}} \times 100$$

$$= \frac{\sqrt{T_2} - \sqrt{T_1}}{\sqrt{T_1}} \times 100 = \frac{\sqrt{400} - \sqrt{300}}{\sqrt{300}} \times 100$$

$$= \frac{20 - 17.32}{17.32} \times 100 = 15.5\%$$

21. (a)

Sol. For a diatomic gas, Molar heat capacity at constant pressure,

$$C_p = \frac{7}{4}R$$

Molar heat capacity at constant volume $C_v = \frac{5}{2}R$



$$\therefore \frac{C_p}{C_v} = \frac{7/2R}{5/2R} = 7/5$$

22. (c)

Sol. For a monoatomic gas like helium $\gamma_{\text{He}} = \frac{5}{3}$

For a diatomic gas like oxygen $\gamma_{\text{O}_2} = \frac{7}{5}$

$$\therefore \gamma_{\text{mix}} = \frac{3 \times \gamma_{\text{O}_2} + 2 \times \gamma_{\text{He}}}{(3+2)}$$

$$= \frac{3 \times \frac{7}{5} + 2 \times \frac{5}{3}}{5} = \frac{\frac{21}{5} + \frac{10}{3}}{5} = \frac{113}{15 \times 5} = 1.5$$

23. (a)

Sol. In a process $PV^x = \text{constant}$, molar heat capacity is

given by $C = \frac{R}{\gamma-1} + \frac{R}{1-x}$

As the process is $\frac{P}{V} = \text{constant}$, i.e., $PV^{-1} = \text{constant}$, therefore, $x = -1$.

For an ideal monoatomic gas, $\gamma = \frac{5}{3}$

$$\therefore C = \frac{R}{\frac{5}{3}-1} + \frac{R}{1-(-1)} = \frac{3}{2}R + \frac{R}{2} = 2R$$

$$\Delta Q = nC(\Delta T) = 1(2R)(2T_0 - T_0) = 2RT_0.$$

24. (a)

Sol. For a gas, we know $\frac{R}{C_v} = \gamma - 1$

or $0.67 = \gamma - 1$ or, $\gamma = 1.67$

Hence the gas is monoatomic.

25. (a)

Sol. $\frac{V_{\text{rms}_2}}{V_{\text{rms}_1}} = \sqrt{\frac{T_2}{T_1}} = \sqrt{\frac{480}{120}}$

$$V_{\text{rms}} = 2(V_{\text{rms}_1})$$



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26. (c)

Sol. $\frac{3}{2}$

27. (b)

Sol. Boyle's law is applicable to an isothermal process where temperature remains constant.

28. (b)

Sol. Rate of cooling \propto difference in temperature

$$\frac{dT}{dt} \propto \Delta\theta \Rightarrow \frac{dT}{dt} = K\Delta\theta$$

in first case

$$dT = 61 - 59 = 2$$

$$\Delta\theta = 60 - 30 = 30$$

$$dt = 4 \text{ minute}$$

$$\therefore K = \frac{dT}{\Delta\theta dt} = \frac{2}{30 \times 4} = \frac{1}{60}$$

For second case

$$dT = 2$$

$$\Delta\theta = 50 - 30 = 20$$

$$\therefore dt = \frac{dT}{K\Delta\theta} = \frac{2}{\frac{1}{60} \times 20} = 6 \text{ min.}$$

29. (b)

Sol. $PV^\gamma = \text{const.}$

$$P_0 V^{4/3} = P' \left(\frac{V}{8}\right)^{4/3}$$

$$P' = (2)^4 P_0 = 16P_0$$

30. (a)

Sol. For adiabatic process

$$\frac{\Delta P}{\Delta V} = -\frac{\gamma P}{V}$$

$$\frac{\Delta P}{P} \times 100 = -\frac{\Delta V}{V} \times 100 = \frac{2}{3}$$



$$\begin{aligned}\frac{\Delta V}{V} \times 100 &= -\frac{1}{\gamma} \times \frac{2}{3} \\ &= -\frac{2}{3} \times \frac{2}{3} = -\frac{4}{9} \%\end{aligned}$$

31. (c)

Sol. For an adiabatic process $dQ = 0 = dU + dW$

$$\text{or } 0 = dU + PdV$$

From the given equation

$$dU = 3(PdV + VdP)$$

$$\therefore 0 = 3(PdV + VdP) + PdV$$

$$\text{or } 4P(dV) + 3V(dP) = 0$$

$$\text{or } 4\left(\frac{dV}{V}\right) = -3\left(\frac{dP}{P}\right)$$

On integrating, we get

$$\ln(V^4) + \ln(P^3) = \text{constant}$$

$$\text{or } PV^{4/3} = \text{constant}$$

$$\text{i.e., } \gamma = \frac{4}{3}$$

i.e., gas is polyatomic.

32. (d)

Sol. $(\Delta U) = nC_V\Delta T$, $(\Delta Q)_P = nC_P\Delta T$

$$\frac{\Delta U}{(\Delta Q)_P} = \frac{C_V}{C_P} = \frac{1}{\gamma} = \frac{5}{7}$$

33. (c)

Sol. $\Delta Q = nC_P\Delta T$

$$W = nR\Delta T$$

$$\Delta U = nC_V\Delta T$$

34. (b)

$$\text{Sol. } \eta = \frac{25}{100} = 1 - \frac{300}{T_1}$$



35. (b)

Sol. Work done, $W = P\Delta V$

$$= 2 \times 10^5 (150 - 50) \times 10^{-3}$$

$$= 2 \times 10^4 J$$

36. (b)

Sol. since the gas is compressed adiabatically, then

$$dQ = 0 \text{ and } dW = -150 J$$

From first law of thermodynamics

$$dQ = dU + dW$$

$$\therefore dU = -dW = -(-150) = 150 J$$

37. (c)

Sol. As no work is done, therefore, $\Delta W = 0$

According to first law of thermodynamics

$$\Delta Q = \Delta U + \Delta W = \Delta U = nC_v \Delta T = n \left(\frac{R}{\gamma - 1} \right) \Delta T$$

$$\text{Here, } n = 2, \gamma = \frac{5}{3}$$

$$\Delta T = T_2 - T_1 = (373 - 273) = 100 K$$

$$\Delta Q = 2 \times \frac{R}{\left(\frac{5}{3} - 1 \right)} \times 100 = 300 R$$

38. (b)

Sol. Here, $C_v = \frac{3}{2} R$

Since $C_p - C_v = R$

$$\therefore C_p = C_v + R = \frac{3}{2} R + R = \frac{5}{2} R$$

39. (a)

Sol. $PV^\gamma = \text{constant}$

40. (c)

Sol. The given diagram shows that the curves move away from the origin at higher temperature.

41. (b)

Sol. Useful work done per hour = $9.5 \times 10^6 J$

Heat absorbed per hour = $6.2 \times 10^7 J$

Amount of heat wasted per hour

= Heat absorbed per hours – useful work done per hour



$$=6.2 \times 10^7 J - 9.5 \times 10^6 J = 10^6 (62 - 9.5) J$$

$$=5.25 \times 10^7 J$$

42. (c)

Sol. Here, $dW = PdV = \frac{RT}{V} dV$ ($\because PV = RT$).....(i)

Given $V = KT^{2/3} \therefore dV = K \frac{2}{3} T^{-1/3} dT$

$$\therefore \frac{dV}{V} = \frac{K \frac{2}{3} T^{-1/3} dT}{KT^{2/3}} = \frac{2}{3} \frac{dT}{T} \dots\dots (ii)$$

Form (i) $W = \int_{T_1}^{T_2} RT \frac{dV}{V}$

$$= \int_{T_1}^{T_2} RT \frac{2}{3} \frac{dT}{T} \quad (\text{using } (ii))$$

$$\therefore W = \frac{2}{3} R(T_2 - T_1) = \frac{2}{3} R \times 60 = 40R$$

43. (d)

Sol. According to an ideal gas equation

$$PV = nRT$$

Or $V = \frac{nRT}{P}$

$$\therefore P = \frac{a}{T} \text{ (Given) } \dots\dots (i)$$

$$\therefore V = \frac{nRT^2}{a}$$

$$\Rightarrow dV = \frac{2nRT}{a} dT \dots\dots (ii)$$

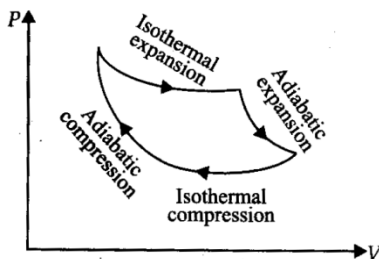
Work done by the gas, $dW = PdV$

Or $W = \int_T^{4T} \frac{a}{T} \frac{2nRT}{a} dT$ (using (i) and (ii))

$$= [2nRT]_T^{4T} = 6nRT$$

44. (a)

Sol.



45. (b)

Sol. The efficiency $\eta = 1$ is maximum efficiency, it shows that the heat engine is 100% efficient which is practically not possible.

46. (d)

Sol. Here, $\eta_1 = 1 - \frac{T_2}{T_1}$ Or $0.25 = 1 - \frac{T_2}{T_1} \Rightarrow \frac{1}{4} = 1 - \frac{T_2}{T_1}$

$$\frac{T_2}{T_1} = 1 - \frac{1}{4} = \frac{3}{4}$$

According to question

$$\eta_2 = 2\eta_1 \text{ and } T_2 = T_2 - 58^\circ\text{C}$$

$$\therefore 2 \times \frac{1}{4} = 1 - \frac{(T_2 - 58^\circ\text{C})}{T_1} \Rightarrow 1 - \frac{1}{2} = \frac{T_2 - 58^\circ\text{C}}{T_1} \quad \frac{1}{2} = \frac{T_1}{T_1} - \frac{58^\circ}{T_1} \Rightarrow \frac{3}{4} - \frac{1}{2} = \frac{58}{T_1} \Rightarrow T_1 = 232^\circ\text{C}$$

47. (a)

$$\text{Sol. } \eta = 1 - \frac{T_2}{T_1} = \frac{T_1 - T_2}{T_1}$$

When T_1 and T_2 both are decreased by 100 K each, $(T_1 - T_2)$ stays constant T_1 decreases.

$\therefore \eta$ increases

48. (d)

Sol. Here, $T_1 = 38^\circ = 38 + 273 = 311\text{K}$

$$T_2 = 7^\circ\text{C} = 7 + 273 = 280\text{K}$$

\therefore coefficient of performance of the refrigerator,

$$= \frac{T_2}{T_1 - T_2} = \frac{280}{311 - 280} = 9.03$$

49. (b)

Sol. As constant volume,

$$dW = PdV = P \times 0 = 0$$

$$dQ = mC_v \Delta T = 5 \times 0.172 \times 4 \text{ cal}$$

$$= 5 \times 0.172 \times 4 \times 4.2 \text{ J}$$

$$= 14.4 \text{ J}$$

$$\therefore dU = dQ - dW = 14.4 - 0$$

$$= 14.4 \text{ J}$$



50. (c)

Sol. Since volume of water remains constant, then work done

$$\Delta W = PdV = 0$$

According to first pair of thermodynamics

$$dQ = dU + dW, dU = dQ = ms\Delta T$$

$$= 1 \times 4148 \times (70 - 40) = 4148 \times 30$$

$$= 124440 J = 1.244 \times 10^5 J$$



51. (b)

$$\text{Sol. } M = \frac{W \times 1000}{\text{mol.mass} \times \text{Volume in ml.}} = \frac{9.8 \times 1000}{98 \times 2000} = 0.05 M$$

52. (a)

Sol. Osmotic pressure is colligative property.

53. (b)

$$\text{Sol. According to Raoult's Law } \frac{P^0 - P_s}{P^0} = x_B$$

$$(\text{Mole fraction of solute}) x_B = \frac{0.8 - 0.6}{0.8} = 0.25 .$$

54. (d)

$$\text{Sol. } \frac{P^0 - P_s}{P^0} = \text{molality} \times (1 - \alpha + x\alpha + y\alpha) \text{ the value of } P^0 - P_s \text{ is maximum for } BaCl_2 .$$

55. (b)

Sol. Chloroform & acetone form a non-ideal solution, in which $A \dots B$ type interaction are more than $A \dots A$ & $B \dots B$ type interaction due to H -bonding. Hence, the solution shows, negative deviation from Raoult's Law i.e., $\Delta V_{mix} = -ve$; $\Delta H_{mix} = -ve$

\therefore total volume of solution = less than (30 + 50 ml)

or $< 80 \text{ ml}$

56. (a)

Sol. Aromatic compound generally separated by fractional distillation. e.g. Benzene + Toluene.

57. (b)

$$\text{Sol. Isotonic solution} = \frac{w_1}{m_1 V_1} = \frac{w_2}{m_2 V_2}$$

$$= \frac{w_1}{342 \times 1} = \frac{6}{60 \times 1} = \frac{342 \times 6}{60} = 34.2 .$$

58. (b)

$$\text{Sol. } \pi = \frac{n}{V} RT \Rightarrow M_p = \left(\frac{m}{V} \right) \frac{RT}{\pi}$$

59. (b)

$$\text{Sol. } C = \frac{5}{342} \times \frac{1}{100} \times 1000 = \frac{50}{342} \text{ mol/l}$$

$$\pi = \frac{50}{342} \times 0.082 \times 423 = 5.07 \text{ atm}$$

60. (c)

$$\text{Sol. } P = \frac{w}{mv} RT \text{ since } wvT \text{ are constant thus } P \propto \frac{1}{m}$$

$$P_2 > P_1 > P_3 .$$

61. (a)

Sol. Osmosis occur from dilute solution to concentrate solution. Therefore solution A is less concentrated than B.



62. (b)

Sol. $\Delta T_b = imk_b = 0.52 \times 1 \times 2 = 1.04$.

$\therefore T_b = 100 + 1.04 = 101.04^\circ C$.

63. (d)

Sol. $m = \frac{K_b \times w \times 1000}{\Delta T_b \times W} = \frac{2.16 \times 0.15 \times 1000}{0.216 \times 15} = 100$.

64. (b)

Sol. Due to higher pressure inside the boiling point elevated.

65. (b)

Sol. $\Delta T_b = K_b \times m$ or $K_b = \Delta T_b / m$

66. (c)

Sol. $\Delta T_f = K_f \times \text{molality} = 1.86 \times 0.05 = 0.093^\circ C$

Thus freezing point = $0 - 0.093 = -0.093^\circ C$.

67. (c)

Sol. $\Delta T_f = \frac{100 \times K \times w}{m \times W}$ $\therefore 0.186 = \frac{100 \times 18.6 \times w}{60 \times 500}$

$w = 3g$

68. (b)

Sol. $\Delta T_f = K_f \times m = 1.86 \times 0.1 = 0.186$.

69. (c)

Sol. $(NH_4)_3PO_4$ gives maximum ion. Hence, its osmotic pressure is maximum.

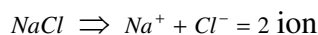
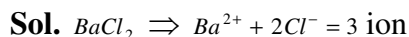
70. (b)

Sol. $BaCl_2$ gives maximum ion hence it shows lowest vapour pressure.

71. (c)

Sol. Na_2SO_4 have more osmotic pressure than $NaCl$ solution because Na_2SO_4 gives 3 ions.

72. (c)



Glucose \Rightarrow No ionization $\therefore BaCl_2 > NaCl >$ Glucose

73. (a)

Sol. $K_4[Fe(CN)_6]$ dissociates as $4K^+ + [Fe(CN)_6]^{4-}$, thus 1 molecule dissociates into five particles in the similar way $Al_2(SO_4)_3$ also gives five particles per molecule.

74. (a)

Sol. Benzoic acid in benzene undergoes association through intermolecular hydrogen bonding.

75. (c)

Sol. Positive deviation from Raoult's law implies higher



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vapour pressure and thus lower boiling point.

76. (b)

Sol. Henry's law states that mass of a gas dissolved per unit volume of a solvent is directly proportional to the pressure of the gas at that temperature.

$$m \propto p \text{ or } m = kp$$

77. (a)

Sol. At high altitudes the partial pressure of oxygen is less than that at the ground level. This leads to low concentration of oxygen in the blood and tissues of people living at that temperature

78. (b)

Sol. The number of solute particles in solution

79. (a)

Sol. Unit of ebullioscopic constant (K_b) is $K \text{ kg mol}^{-1}$ or $K (\text{molality})^{-1}$

$$(\because \text{molality} = \text{mol kg}^{-1})$$

80. (b)

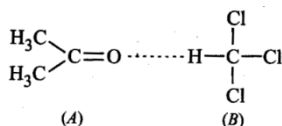
Sol. $\text{KCl} \longrightarrow \text{K}^+ + \text{Cl}^-$, thus $i = 2$

$\text{NaCl} \longrightarrow \text{Na}^+ + \text{Cl}^-$ thus, $i = 2$

$\text{K}_2\text{SO}_4 \longrightarrow 2\text{K}^+ + \text{SO}_4^{2-}$ thus, $i = 3$

81. (b)

Sol. When acetone and chloroform are mixed together a hydrogen bond is formed between them which increase intermolecular interactions, hence A - B interactions are stronger than A - A and A - B interactions.



82. (b)

Sol. Molality, $m = \frac{M}{1000d - MM_2} \times 1000$

where M = molarity, d = density, M_2 = molecular mass

$$m = \frac{2.05}{1000 \times 1.02 - 2.05 \times 60} = 2.28 \text{ mol kg}^{-1}$$

83. (b)

Sol. $\Delta T_f = i \times k_f \times m$

$$2.8 = 1 \times 1.86 \times \frac{x}{62 \times 1}$$

$$x = \frac{2.8 \times 62}{1.86} = 93 \text{ gm}$$



84. (c)

Sol. pH = 12, pOH = 14 - 12 = 2, $[\text{OH}^-] = 10^{-2} = 0.1 \alpha$

or $\alpha = 0.1$

$i = 1 + (n - 1)\alpha = 1 + (2 - 1) \times 0.1 = 1.1$

$\pi = iCRT = 1.1 \times 0.1 RT = 0.11 RT$

85. (c)

Sol. Initially $P_m = P^0_X \cdot X_X + P^0_Y \cdot X_Y$

$$550 = P^0_X \left(\frac{1}{1+3} \right) + P^0_Y \left(\frac{3}{1+3} \right)$$

$$\text{or } P^0_X + 3P^0_Y = 2200 \quad \dots(i)$$

When 1 mole of Y is further added to it

$$P_m = P^0_X \cdot X_X + P^0_Y \cdot X_Y$$

$$560 = P^0_X \left(\frac{1}{1+4} \right) + P^0_Y \left(\frac{4}{1+4} \right)$$

$$\therefore P^0_X + 4P^0_Y = 2800 \quad \dots(ii)$$

By eqs. (i) and (ii)

$P^0_X = 400 \text{ mm}$ and $P^0_Y = 600 \text{ mm}$.

86. (a)

$$\text{Sol. } i = \frac{\text{Theo. Mw.}}{\text{exp. Mw}} = \frac{164}{65.6} = 2.5$$

$$\alpha = \frac{1-i}{n-1} = \frac{2.5-1}{3-1} = 0.75$$

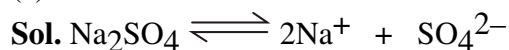
$\alpha = 75 \%$

87. (b)

$$\text{Sol. Moles of urea} = \frac{6.02 \times 10^{20}}{6.02 \times 10^{23}} = 10^{-3} \text{ moles}$$

$$\text{Concentration (molarity) of solution} = \frac{10^{-3}}{100} \times 1000 = 0.01 \text{ M.}$$

88. (c)



$$1 \qquad 0 \qquad 0$$

$$1 - a \qquad 2a \qquad a$$

$$\text{Vant Hoff factor (i)} = \frac{1 - \alpha + 2\alpha + \alpha}{1} = 1 + 2\alpha$$

89. (b)

Sol. $10 \mu\text{g}$ per deciliter

$$\Rightarrow 10 \times 10^{-6} \text{ g in } 100 \text{ mL}$$

$$\therefore 10^9 \text{ parts (1 billion) has} = \frac{10 \times 10^{-6}}{100} \times 10^9 \text{ g} = 100 \text{ g}$$



90. (a)

Sol. $760 = 300 X_A + 800 (1 - X_A)$

$$\Rightarrow 760 = 800 - 500 X_A$$

$$\Rightarrow 500 X_A = 40$$

$$\therefore X_A = \frac{40}{500} = 0.08.$$

91. (b)

Sol. Molality = $\frac{\text{Number of molesolute}}{\text{Weight of solvent (in g)}} \times 1000$

$$m = \frac{648}{18} \times \frac{1000}{648} = 55.5 \text{ m}$$

92. (a)

Sol. Mass of solution = Mass of C_6H_6 + Mass of CCl_4

$$= 22 + 122 = 144 \text{ g}$$

$$\text{Mass \% of } CCl_4 = \frac{122}{144} \times 100 = 84.72\%$$

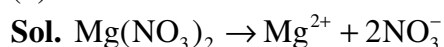
93. (b)

Sol. Hypertonic solution has high osmotic pressure. When a plant cell is placed in hypertonic solution water will diffuse out of the cell resulting in shrinking of the cell.

94. (b)

Sol. When salt is spread over snow, snow starts melting from the surface because of depression in freezing point and helps in clearing the roads.

95. (b)



$$\alpha = \frac{i-1}{n-1} = \frac{2.74-1}{3-1} = \frac{1.74}{2} = 0.87$$

$$\text{Degree of dissociation} = 0.87 \times 100 = 87\%$$

96. (b)

Sol. For the same concentration of different solvents any colligative property $\propto i$

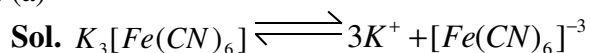
For NaCl, $i = 2$

Sugar solution $i = 1$

$BaCl_2$, $i = 3$; $FeCl_3$, $i = 4$

Thus for sugar solution depression in freezing point is minimum i.e, highest freezing point.

97. (a)





$$\begin{array}{ccc} 1 & 0 & 0 \\ 1-\alpha & 3\alpha & \alpha \end{array}$$

$$\text{Van't Hoff factor } (i) = \frac{1-\alpha+3\alpha+\alpha}{1} = 1+3\alpha$$

98. (c)

Sol. $5A \rightarrow A_5$

$$i = 1 - \left(1 - \frac{1}{n}\right) = 1 - \left(1 - \frac{1}{5}\right) = 0.2$$

99. (a)

Sol. $\Delta T_f = i k_f \times m = 2 \times 1.86 \times 0.5 = 1.86^\circ \text{C}$

$$T_f = T_f^\circ - \Delta T_f = 0 - 1.86 = -1.86^\circ \text{C}$$

100. (a)

Sol. Due to association or dissociation of solute molecules there is a change in number of particles since colligative properties depend on number of particles there is a change in molecular mass.

BOTANY

Q.	ANS.	Q.	ANS.	Q.	ANS.	Q.	ANS.	Q.	ANS.
101	D	113	A	125	A	136	B	148	C
102	A	114	B	126	B	137	B	149	B
103	B	115	D	127	D	138	D	150	C
104	C	116	B	128	B	139	A		
105	B	117	C	129	D	140	C		
106	B	118	C	130	C	141	A		
107	C	119	C	131	C	142	B		
108	A	120	A	132	A	143	A		
109	D	121	D	133	C	144	C		
110	B	122	C	134	A	145	B		
111	B	123	C	135	C	146	C		
112	C	124	C			147	B		



SAFE HANDS & IIT-ian's PACE

EDT-09 (NEET) SOLUTIONS

ZOOLOGY									
Q.	ANS.	Q.	ANS.	Q.	ANS	Q.	ANS.	Q.	ANS
151	C	163	A	175	A	186	A	198	C
152	A	164	C	176	C	187	D	199	D
153	B	165	C	177	C	188	D	200	B
154	A	166	D	178	B	189	B		
155	B	167	C	179	A	190	C		
156	B	168	A	180	C	191	D		
157	B	169	C	181	D	192	B		
158	C	170	B	182	C	193	D		
159	D	171	B	183	D	194	C		
160	D	172	B	184	D	195	A		
161	C	173	C	185	D	196	A		
162	C	174	C			197	B		