

Comprehension-3 (Q.12 to Q.13)

Solution 'A' contains 0.1m AgNO₃, to this solution equal volume of 0.1m BaCl₂ solution is added to form solution 'B'. (Consider complete dissociation of AgNO₃ & density of solutions same as density of water)

$$K_b \text{ of water} = 0.5 \text{ Km}^{-1}$$

12. Boiling point of solution 'A' is

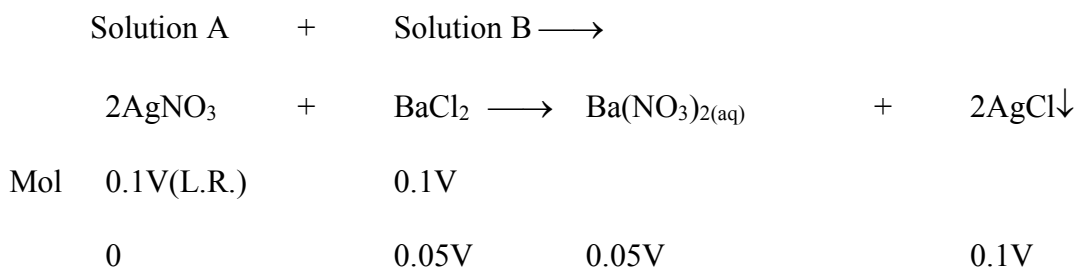
13. Difference between boiling points of solution A & B is $x \times 10^{-2}$, x is

Sol. ΔT_b of solution A

$$\Delta T_b = 2 \times 0.5 \times 0.1 = 0.1$$

$$\text{B.P. of solution A} = 100.1^\circ\text{C}$$

Considering molarity \approx molality



$$\text{Final concentration of solution (B)} = \frac{3 \times 0.05V + 3 \times 0.05V}{2V} = \frac{3 \times 0.1V}{2V} = 0.15m$$

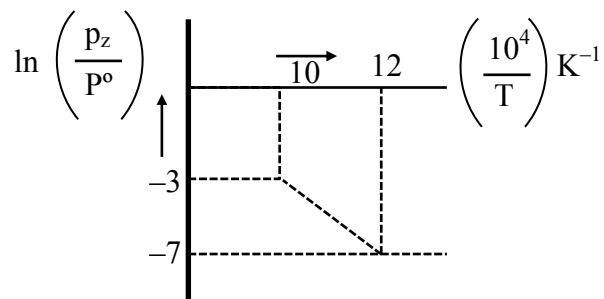
$$\Delta T_b \text{ of solution B} = 0.5 \times 0.15 = 0.075$$

$$T_f \text{ of solution B} = 100.075^\circ\text{C}$$

$$\text{Difference in B.P. of solution B and A} = 0.025$$

Comprehension-4 (Q.14 to Q.15)

For the reaction $x(s) \rightleftharpoons y(s) + z(g)$ $P^\circ = 1 \text{ bar}$



14. ΔH° Determine for the given reaction.

Ans. **166.28 KJ**

Sol. $\ln K = -2 \left(\frac{10^4}{T} \right) + C$

$$-3 = -2 [10] + C$$

$$-3 = -20 + C$$

$$C = 17$$

$$\ln K = -2 \left(\frac{10^4}{T} \right) + 17$$

$$\ln K = -\frac{\Delta H^\circ}{RT} + \frac{\Delta S^\circ}{R}$$

$$-\frac{\Delta H^\circ}{R} = -2 \times 10^4$$

$$\Delta H^\circ = 2 \times 10^4 R$$

$$= 20 \times 8.314 = \mathbf{166.28 \text{ KJ}}$$

15. Determine ΔS° for the given reaction.

Ans. **141.338 J/K**

Sol. $\therefore \frac{\Delta S^\circ}{R} = 17$

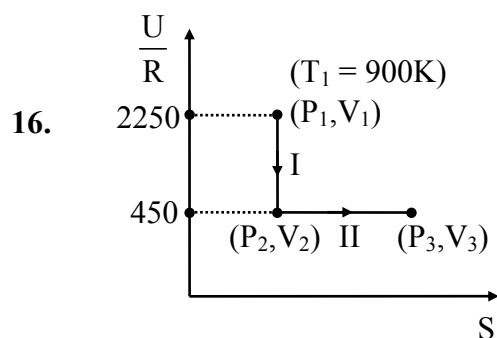
$$\Delta S^\circ = 17 R$$

$$= 17 \times 8.314$$

$$\mathbf{141.338 \text{ J/K}}$$

Rizee

Integer



Process I and II are reversible

$$C_V = \frac{5R}{2}$$

$$(W_I = W_{II})$$

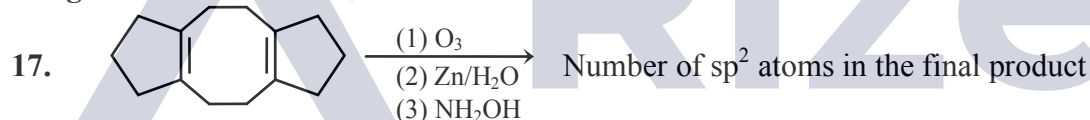
$$\ln \frac{V_3}{V_2} = ?$$

Ans. 10

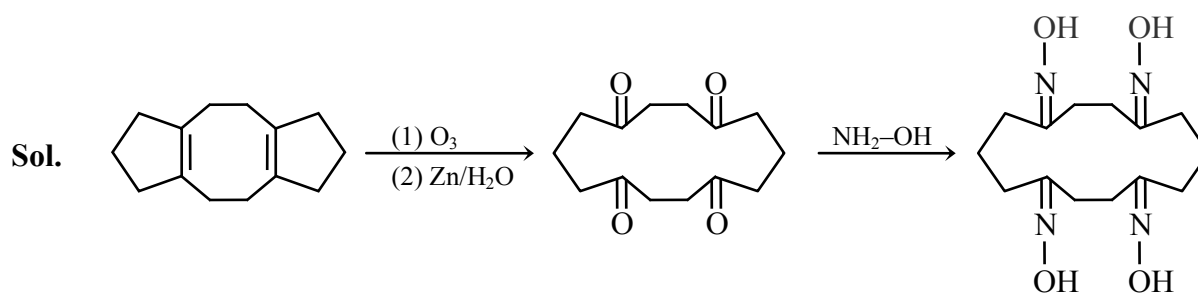
Sol. $\Delta U_I = nC_V\Delta T \Rightarrow -1800R = 1 \times \frac{5R}{2} \times \Delta T \quad \therefore \Delta T_I = -720K \quad \therefore T_2 = 180K$

$$W_{II} = -nRT \ln \left(\frac{V_3}{V_2} \right) \Rightarrow -1800R = -R \times 180 \ln \left(\frac{V_3}{V_2} \right) \quad \therefore \ln \left(\frac{V_3}{V_2} \right) = 10$$

Integer



Ans. 12



Number of sp^2 hybridised atoms = 12 (4-carbon, 4-nitrogen & 4-oxygen)