

TEST INFORMATION

DATE : 10.05.2015

JPT - 01 (ADVANCED)

Syllabus : Full Syllabus

DPP No. # 10 (JEE-ADVANCED)

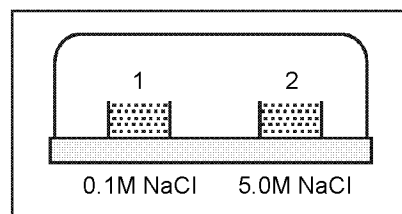
Total Marks : 169

Max. Time : 137 min.

Single choice Objective (–1 negative marking) Q.1 to Q.15	(3 marks 2½ min.)	[45, 37½]
Multiple choice objective (–1 negative marking) Q.16 to Q.20	(4 marks, 3 min.)	[20, 15]
Assertion and Reason ('–1' negative marking) Q.21 to Q.23	(3 marks 2½ min.)	[09, 7½]
Comprehension (–1 negative marking) Q.24 to Q.32	(3 marks 2½ min.)	[27, 22½]
Single Digit Subjective Questions (no negative marking) Q.33 to Q.37	(4 marks 2½ min.)	[20, 12½]
Double Digit Subjective Questions (no negative marking) Q.38 to Q.41	(4 marks 2½ min.)	[16, 10]
Match the column (4 vs 4) (no negative marking) Q.42 to Q.44	(8 marks, 8 min.)	[24, 24]
Match the column (4 vs 5) (no negative marking) Q.45	(8 marks, 8 min.)	[08, 08]

1. Equal volumes of 0.1 M solution of NaCl and 5 M solution of NaCl are kept in a closed vessel (see figure) and temperature is maintained constant. After equilibrium has been established, assuming that volumes are additive, which of the following is (are) true ?

- (A) Volume of 0.1 M solution is lesser than its original volume
 (B) Volume of 0.1 M solution is greater than its original volume
 (C) Volume of 5 M solution is lesser than its original volume
 (D) No change occurs at all.



2. ' V_1 ' ml of an aqueous urea solution having osmotic pressure as 2.4 atm is mixed with ' V_2 ' ml of another aqueous urea solution having osmotic pressure as 4.6 atm at same temperature. What will be value of $\frac{V_1}{V_2}$ if resulting solution after mixing has osmotic pressure as 2.95 atm.
- (A) 1 (B) 1.5 (C) 2 (D) 3

3. The vapour pressure of two pure liquids X and Y which form an ideal solution are 200 and 300 mm of Hg respectively at 300 K. A liquid solution of 'X' and 'Y' in which the mole fraction of 'X' is 0.5 is contained in a cylinder closed by a piston on which pressure can be varied-
- (A) Only if pressure above solution is less than 200 torr, vapour phase can exist.
 (B) Only if pressure above solution is less than 300 torr, vapour phase can exist.
 (C) Only if pressure above solution is more than 200 torr, liquid phase exist.
 (D) Only if pressure above solution is less than or equal to 250 torr, vapour phase can exist.

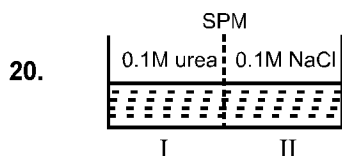
4. A student prepares 2 M, 50 mL HCl solution in water. He drops some of the solution which he compensates with pure water. the resultant solution was found to be isotonic with 3.2 M urea solution. How much of the original solution (in mL) was dropped ?
 (A) 5 (B) 10 (C) 15 (D) 20
5. A solution containing large amount of A and water is steam distilled. The condensate hence obtained contained 0.25 mole fraction of A. The external pressure at which distillation is performed is ($P_w^\circ = 740$ torr and temperature is same.)
 (A) 760 torr (B) 791.3 torr (C) 986.67 torr (D) 886.9 torr
6. What is the % decrease in vapor pressure with respect to solution when saturated solution of Ag_3PO_4 is prepared
 Given : K_{sp} of $\text{Ag}_3\text{PO}_4 = \left(\frac{3}{16}\right)^3 \times 10^{-12}$ (Assume no hydrolysis)
 (A) 6×10^{-4} (B) 1.5×10^{-4} (C) 9×10^{-4} (D) 18×10^{-4}
7. How many grams of sucrose (molecular mass= 342) should be dissolved in 100 gm water in order to produce a solution with 105°C difference between the freezing point and boiling point at 1 atm ?
 ($K_f = 2 \text{ K kg/mol}$ and $K_b = 0.5 \text{ K kg/mol}$)
 (A) 34.2 g (B) 68.4 g (C) 17.1 g (D) 342 g
8. Which one of the following statement is false ?
 (A) Raoult's law states that the vapor pressure of a component over a solution is proportional to its mole fraction in solution
 (B) The osmotic pressure (π) of a solution is given by the equation $\pi = CRT$ (C = molarity of solution)
 (C) The correct order of osmotic pressure for 0.01 M aqueous solution of each compound is $\text{BaCl}_2 > \text{KCl} > \text{HF}$
 (D) Two glucose solutions of same molality prepared in different solvents will have the same boiling point elevation.
9. The Henry's law constant for dissolution of a gas in aqueous medium is 3×10^4 atm. At what partial pressure of the gas (in atm) the molality of gas in aqueous solution will be $\frac{5}{900}$?
 (A) 10^{-4} atm (B) 3 atm (C) 0.3 atm (D) 10 atm
10. Addition of water to which of the following equilibria causes it to shift in the backward direction?
 (A) $\text{CH}_3\text{NH}_2(\text{aq}) + \text{H}_2\text{O}(\ell) \rightleftharpoons \text{CH}_3\text{NH}_3^+(\text{aq}) + \text{OH}^-(\text{aq})$
 (B) $\text{AgCl}(\text{s}) \rightleftharpoons \text{Ag}^+(\text{aq}) + \text{Cl}^-(\text{aq})$
 (C) $\text{HCN}(\text{aq}) + \text{H}_2\text{O}(\ell) \rightleftharpoons \text{H}_3\text{O}^+(\text{aq}) + \text{CN}^-(\text{aq})$
 (D) $[\text{Cr}(\text{dien})_2]^{3+}(\text{aq}) + 3\text{H}_2\text{O}(\ell) + 3\text{Cl}^-(\text{aq}) \rightleftharpoons [\text{Cr}(\text{H}_2\text{O})_3\text{Cl}_3](\text{aq}) + 2 \text{dien}(\text{aq})$
11. At 57°C , gaseous dinitrogen tetroxide is 50% dissociated. Calculate the standard free energy change per mole of $\text{N}_2\text{O}_4(\text{g})$ at this temperature and at 1 atm initial pressure of N_2O_4 .
 ($R = 8.3 \text{ JK}^{-1} \text{ mol}^{-1}$, $\ln 10 = 2.3$, $\log 2 = 0.3$, $\log 3 = 0.48$)
 (A) -756 J mol^{-1} (B) -856 J mol^{-1} (C) -656 J mol^{-1} (D) None of these
12. For the equilibrium $\text{CaCO}_3(\text{s}) \rightleftharpoons \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$, the pressure of CO_2 depends on
 (A) the mass of $\text{CaCO}_3(\text{s})$ (B) the mass of $\text{CaO}(\text{s})$
 (C) The masses of both $\text{CaCO}_3(\text{s})$ and $\text{CaO}(\text{s})$ (D) temperature of the system

13. For the reaction, $\text{NH}_4\text{HS(s)} \rightleftharpoons \text{NH}_3\text{(g)} + \text{H}_2\text{S(g)}$ $K_p = 1225 \text{ (torr)}^2$
In a vessel, $\text{NH}_3\text{(g)}$ at a partial pressure of 50 torr and $\text{H}_2\text{S(g)}$ at a partial pressure 20 torr is taken. After a long time, the total pressure of gas in the vessel becomes :
(A) 80 torr (B) less than 70 torr (C) 70 torr (D) $\cong 76 \text{ torr}$
14. Two moles of gas A_2 are mixed with two moles of gas B_2 in a flask of volume 1 lit. If at equilibrium 0.5 moles of A_2 are obtained. Then find out K_p for reaction :
 $\text{A}_2\text{(g)} + \text{B}_2\text{(g)} \rightleftharpoons 2\text{AB(g)}$
(A) 12 (B) 9 (C) 4 (D) 36
15. For which of the following reactions, $K_p > K_c$ at 298 K :
(A) $\text{XeF}_6\text{(g)} \rightleftharpoons \text{Xe(g)} + 3\text{F}_2\text{(g)}$ (B) $\text{N}_2\text{(g)} + \text{O}_2\text{(g)} \rightleftharpoons 2\text{NO(g)}$
(C) $\frac{1}{2}\text{N}_2\text{(g)} + \frac{3}{2}\text{H}_2\text{(g)} \rightleftharpoons \text{NH}_3\text{(g)}$ (D) $\text{CO(g)} + \text{H}_2\text{O(g)} \rightleftharpoons \text{CO}_2\text{(g)} + \text{H}_2\text{(g)}$
16. A substance 'A' has the following variation of vapor pressure with temperature for its solid state and liquid state. Identify the options which are correct :
Given for solid A : $\log_{10}P = 4 - \frac{2000}{T}$
For liquid A : $\log_{10}P = 3.5 - \frac{1500}{T}$
where P is in mm of Hg and T in K
(A) Triple point temperature of substance 'A' is 1000 K
(B) ΔH_{sub} will be approximately 9.212 Kcal/mol
(C) ΔH_{fusion} will be approximately 9.212 Kcal/mol
(D) ΔH_{vap} will be approximately 6.909 Kcal/mol
17. An ideal binary liquid solution of A and B has a vapour pressure of 900 mm of Hg. It is distilled at constant temperature till $\frac{2}{3}$ of the original amount is distilled. If the mole fraction of 'A' in the residue and mole fraction of B in the condensate is 0.3 and 0.4 respectively and vapour pressure of residue is 860 mm of Hg, then which of the following is/are correct options :
(A) The initial mixture taken should be an equimolar mixture of A and B.
(B) The first vapors formed will have more moles of A as compared to moles of B.
(C) $P_A^\circ = 1000 \text{ torr}$
(D) The vapor pressure above the condensate is 920 torr at same temperature.
18. 10 ml of FeC_2O_4 solution requires 30 ml of 0.4 M KMnO_4 solution in acidic medium for titration. 25 ml of the same FeC_2O_4 solution is mixed in some water to make a solution containing 900 g of water. Which of the following is/are true for this solution ?
(K_f for water = 1.8/K kg/mol)
(A) Freezing point of the solution is 0.2 K
(B) The RLVP of the solution is 2×10^{-3}
(C) Osmotic pressure of the initial FeC_2O_4 solution is 49.2 atm at 300 K.
(D) Osmotic pressure of the initial KMnO_4 solution (without acid) is 19.68 atm at 300 K.

19. Consider the following statements :
- (I) An increase in pressure (caused by decrease in volume) at equilibrium results in increase in molar concentration of each gaseous substance involved at new equilibrium.
- (II) An increase in pressure (caused by decrease in volume) at equilibrium results in increase in no. of moles of each gaseous substance involved.
- (III) For the reaction $A(s) \rightleftharpoons B(g) + C(g)$ starting with A only at constant temperature, total pressure at equilibrium (of B(g) & C(g)) is not affected by changing the volume of container.
- (IV) $H_2O(l) \rightleftharpoons H_2O(g)$; on temperature increase, K_p of this reaction is increased.

Tick the correct statement(s)

- (A) (I) (B) (II) (C) (III) (D) (IV)



0.1M urea and 0.1M NaCl aqueous solutions of same volume are separated by semi-permeable membrane. Identify the true correct statement(s).

- (A) No water will flow across the membrane (B) Water will flow from I to II
(C) Water will flow from II to I (D) Both solutions will be isotonic in the end

21. **Statement-1** : Binary ideal solution boils at temperature which is lower than normal boiling point of more volatile component and higher than the normal boiling point of less volatile component.

Statement-2 : For any composition of ideal mixture, its boiling temperature is in between the normal boiling points of pure component.

- (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(C) Statement-1 is True, Statement-2 is False
(D) Statement-1 is False, Statement-2 is True

22. **Statement-1** : At ice \rightleftharpoons water equilibrium, on increasing the pressure freezing point of water decreases.

Statement-2 : Ice has low density so equilibrium shifts in forward direction when pressure is increased.

- (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(C) Statement-1 is True, Statement-2 is False
(D) Statement-1 is False, Statement-2 is True
(4) Statement-1 is False, Statement-2 is True

23. **Statement-1** : Relative lowering of vapour pressure in a solution is equal to mole fraction of solute in solution.

Statement-2 : In ideal solution $\Delta H_{mix} \neq 0$ and $\Delta V_{mix} \neq 0$

- (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(C) Statement-1 is True, Statement-2 is False
(D) Statement-1 is False, Statement-2 is True

Comprehension # 1

Properties such as boiling point, freezing point and vapour pressure of a pure solvent change when solute molecules are added to get homogeneous solution. These are called colligative properties. Application of colligative properties are very useful in day-to-day life. One of its examples is the use of ethylene glycol and water mixture as anti-freezing liquid in the radiator of automobiles.

A solution M is prepared by mixing ethanol and water. The mole fraction of water in the mixture is 0.9

Given : Freezing point depression constant of water (K_f^{water}) = $1.86 \text{ K kg mol}^{-1}$

Freezing point depression constant of ethanol (K_f^{ethanol}) = $2.0 \text{ K kg mol}^{-1}$

Boiling point elevation constant of water (K_b^{water}) = $0.52 \text{ K kg mol}^{-1}$

Boiling point elevation constant of ethanol (K_b^{ethanol}) = $1.2 \text{ K kg mol}^{-1}$

Standard freezing point of water = 273 K

Standard freezing point of ethanol = 155.7 K

Standard boiling point of water = 373 K

Standard boiling point of ethanol = 351.5 K

Vapour pressure of pure water = 32.8 mm Hg

Vapour pressure of pure ethanol = 40 mm Hg

Molecular weight of water = 18 g mol^{-1}

Molecular weight of ethanol = 46 g mol^{-1}

In answering the following questions, consider the solution to be ideal dilute solutions and solutes to be non-volatile and non-dissociative.

24. The freezing point of the solution M is
(A) 354.4 K (B) 261.52 K (C) 234.2 K (D) 150.9 K
25. The difference in the vapor pressure of solution M and N is :
(solution N is prepared by adding ethanol in water till mole fraction of ethanol becomes 0.9)
(A) 5.76 torr (B) 6.48 torr (C) 36 torr (D) 32 torr

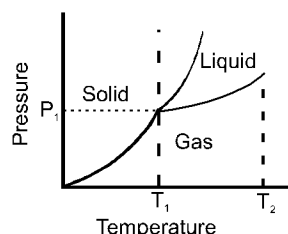
Comprehension # 2

When non-volatile solute is added into water the resulting vapour pressure gets decreased in proportion to the amount of solute added. This is given by Raoult's law. Answer the following questions.

26. To observe 1% decrease in the vapour pressure upon addition of 1 mmol of solute ($i = 1$) the amount of water needed is:
(A) 100 mol (B) 99 mol (C) 0.1 mol (D) 0.099 mol
27. Which of the following will decrease the vapour pressure of water by maximum amount for the same quantity of water ?
(A) 1 g NaCl (B) 1 g KCl (C) $1 \text{ g Na}_2\text{SO}_4$ (D) 1 g Urea

Comprehension # 3

Phase diagrams provide information about the physical states of matters for different pressures and temperatures. A general PT phase diagram is shown (Answer the following questions):

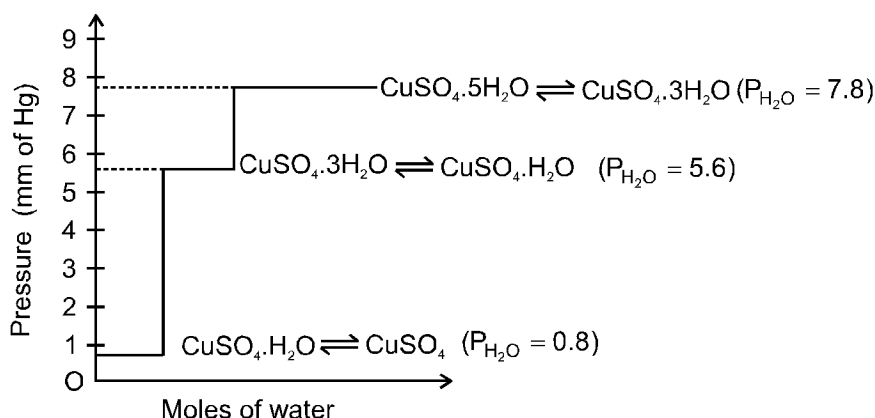


28. Consider the statements:
I : Substance expands upon fusion.
II : Substance occurs in liquid state for $P > P_1$ and $T > T_1$.
Identify the correct option.
(A) Both I and II are correct (B) Both I and II are incorrect
(C) Only I is correct (D) Only II is correct

29. It is known that substance sublimes at 2 atm and 400 K. Then the correct option is:
 (A) $P_1 > 2 \text{ atm}$ & $T_1 > 400 \text{ K}$ (B) $P_1 < 2 \text{ atm}$ & $T_1 > 400 \text{ K}$
 (C) $P_1 > 2 \text{ atm}$ & $T_1 < 400 \text{ K}$ (D) $P_1 < 2 \text{ atm}$ & $T_1 < 400 \text{ K}$
30. A solid-liquid equilibrium mixture is subjected to high pressure then the following is observed :
 (A) Freezing point decreases (B) Amount of liquid increases
 (C) Sublimation takes place (D) Amount of solid increases

Comprehension # 4

Dehydration of salts is an important class of heterogenous reaction. The salt hydrates often dissociate in steps to form a number of intermediate hydrates according to the prevailing pressure of moisture in contact with the solid hydrates. Thus copper sulphate pentahydrate on dissociation yields trihydrates, monohydrates and then the anhydrous salts in the above order as follows.



31. The ratio of equilibrium constant between pentahydrate and trihydrate and equilibrium between trihydrate and monohydrate is
 (A) 1.9 (B) 2.9 (C) 8.6 (D) 5.6
32. Which of the following conditions is favourable for dehydration of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ under equilibrium system
 $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}(\text{s}) \rightleftharpoons \text{CuSO}_4(\text{s}) + 5\text{H}_2\text{O}(\text{g})$
 (i) $P_{\text{H}_2\text{O}}$ (in air) < 7.8 torr (ii) $P_{\text{H}_2\text{O}}$ (in air) < 5.6 torr
 (iii) $P_{\text{H}_2\text{O}}$ (in air) < 0.8 torr (iv) $P_{\text{H}_2\text{O}}$ (in air) > 7.8 torr
 The correct option is
 (A) (iv) (B) (i), (ii) (C) (iii) (D) (i), (ii), (iii)
33. By how many of the following ways, the concentration of CO_2 can be altered at equilibrium ?
 $\text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightleftharpoons \text{CO}_2(\text{g}) + \text{H}_2(\text{g}) \quad \Delta H = +ve$
 (a) By increasing temperature ($V = \text{constant}$) (b) By decreasing volume ($T = \text{constant}$)
 (c) By increasing volume ($T = \text{constant}$) (d) By adding more $\text{CO}(\text{g})$ ($V, T = \text{constant}$)
 (e) By removing $\text{H}_2(\text{g})$ ($V, T = \text{constant}$) (f) By adding inert gas ($P, T = \text{constant}$)
 (g) By adding inert gas ($V, T = \text{constant}$)
34. 20 g of naphthoic acid ($\text{C}_{11}\text{H}_8\text{O}_2$) is dissolved in 50 g of benzene ($K_f = 1.72 \text{ K kg mol}^{-1}$). If the Van't Hof factor (i) of naphthoic acid is 0.5 then the value of depression in freezing point (K) will be :

35. The freezing point of an aqueous solution containing 0.1 mol/kg of KCN was -0.38°C . Then gradually increasing moles of $\text{Hg}(\text{CN})_2$ are added and freezing point is measured. The freezing point increased to a maximum of -0.285°C and then again decreased. What is the value of x , if the following reaction takes place ? $\text{Hg}(\text{CN})_2(\text{aq}) + x(\text{CN}^-)(\text{aq}) \longrightarrow \text{Hg}(\text{CN})_{x+2}^{x-}(\text{aq})$
36. Dissolving 1 mole of camphor ($\text{C}_{10}\text{H}_{16}\text{O}$) in one mole of an equimolar mixture of acetophenone(A) ($P_A^0 = 600$ torr) and benzophenone(B) ($P_B^0 = 400$ torr) fails to change its vapor pressure. However, adding x moles of (non-volatile) anthracene to this solution lowers its vapor pressure to 200 torr. If vapor pressure of pure camphor is 100 y (torr) find $(x + y)$.
37. Vapour pressure of an equimolar mixture of benzene and toluene at a given temperature was found to be 80 mm of Hg. If vapour above the liquid phase is condensed in a beaker, vapour pressure of this condensate at the same temperature was found to be 100 mm of Hg. If the pure state vapour pressure of benzene and toluene is respectively x and y . Then determine value of $\frac{x+2y}{50}$:
38. A current of dry air passed (in sequence) through a vessel having pure water then through a vessel having 0.2M NaCl aqueous and finally through a vessel having 0.2M Urea aqueous solution. Consider three variables a (for pure water vessel), b (for NaCl vessel) and c (for Urea vessel). Take the value of the variable to be 10 if loss of mass is observed in a vessel, 5 if gain in mass is observed for a vessel and 0 if no change in mass of the vessel is observed. Report your answer as $(a + 2b + 3c)$.
39. Consider the equilibrium, $\text{Ni}(\text{s}) + 4\text{CO}(\text{g}) \rightleftharpoons \text{Ni}(\text{CO})_4(\text{g})$ $K_p = 0.125 \text{ atm}^{-3}$. If equal number of moles of CO and $\text{Ni}(\text{CO})_4$ (ideal gases) are mixed in a small container fitted with a piston, if the maximum total pressure is P (in cm of Hg) to which this mixture must be brought in order to just precipitate out metallic Ni then report your answer as $P/4$.
40. Equilibrium constant for the given reaction is $K = 10^{20}$ at temperature 300 K
 $\text{A}(\text{s}) + 2\text{B}(\text{aq.}) \rightleftharpoons 2\text{C}(\text{s}) + \text{D}(\text{aq.})$ $K = 10^{20}$
 Calculate the equilibrium concentration of B (in mol/L) starting with mixture of 1 mole of A and 1/2 mole/litre of B in a container of volume 1L at 300 K
 (Give your answer by multiplying it with 10^{12})
41. 1.15 grams of a mixture of NO_2 and N_2O_4 at equilibrium has a pressure of 0.82 atm, at temperature 600 K in a container of volume 1 litre. Calculate degree of dissociation of N_2O_4 assuming that all the NO_2 present comes from N_2O_4 by the equilibrium $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$ [Take $R = 0.082 \text{ lit-atm mol}^{-1} \text{ K}^{-1}$]. (Write your answer after multiplication with 100)
42. 1 mole of A is added in 1 kg water. Volume is nearly 1L. To this mixture, small amount of B is added such that it act as limiting reagent. Match the effect of addition of B in Column I with entries in column II

Column-I			Column-II	
A		B		
(A)	KCN	+ AgCN(s)	(p)	Boiling point increase
(B)	CuS(s)	+ Conc. HNO_3	(q)	Freezing point does not increase
(C)	CH_3COOH	+ $\text{Ba}(\text{OH})_2$ ($\alpha < 0.1$)	(r)	Osmotic pressure is unchanged
(D)	HgI_2	+ KI	(s)	Vapor pressure decreases

43.	Column - I Reactions	Column - II Relation between K_p and K_c
	(A) $\text{NH}_4\text{HS (s)} \rightleftharpoons \text{NH}_3\text{(g)} + \text{H}_2\text{S (g)}$	(p) $K_p = \frac{K_c}{RT}$
	(B) $\text{N}_2\text{(g)} + \text{O}_2\text{(g)} \rightleftharpoons 2\text{NO (g)}$	(q) $K_c = \frac{K_p}{RT}$
	(C) $\frac{1}{2}\text{N}_2\text{(g)} + \frac{3}{2}\text{H}_2\text{(g)} \rightleftharpoons \text{NH}_3\text{(g)}$	(r) $K_p = K_c$
	(D) $2\text{NOBr (g)} \rightleftharpoons 2\text{NO(g)} + \text{Br}_2\text{(g)}$	(s) $K_p = K_c (RT)^2$

44. In this problem α stands for degree of association / dissociation. The symbols have general meaning. Use

$T = 300\text{ K}$ and $R = \frac{1}{12}\text{ L-atm/mole-K}$ wherever needed.

Column - I	Column - II
(A) 0.1 mole AlCl_3 added in 89.8 mole solvent and $\text{RLVP} = \frac{1}{450}$	(p) $i = 2$
(B) 0.1 mole HCOOH added in 2 L water, making 2 L solution and $\pi = 1.5\text{ atm}$	(q) $\alpha = \frac{1}{3}$
(C) 40 g of a solute having molar mass 20000 amu dissolved in water to make a solution of volume 1 L and its osmotic pressure is measured to be 0.025 atm	(r) $\alpha = \frac{1}{5}$
(D) The freezing point of a solution containing 0.1 mole of $\text{K}_4[\text{Fe}(\text{CN})_6]$ in 2 kg water is -0.35 K in comparison to -0.1 K , when 0.1 mole of urea is added in 3 kg water. For $\text{K}_4[\text{Fe}(\text{CN})_6]$ solution	(s) $i = \frac{1}{2}$

45. $P_A^\circ, P_B^\circ, P_C^\circ$ are vapor pressure of pure A, B and C.

X_A = mole fraction of A in liquid phase

Y_A = mole fraction of A in vapor phase

Column - I	Column - II (Possibilities)
(A) Equimolar solution of A, B and C behaving ideally. $P_A^\circ > P_B^\circ > P_C^\circ$	(p) $Y_A > Y_C$
(B) Equimolar solution of A and C behaving Ideally, $P_A^\circ < P_C^\circ$	(q) $X_B = Y_B$
(C) High boiling point azeotrope of B and C at molar composition 2 : 1 respectively ; $P_B^\circ > P_C^\circ$	(r) $Y_C > X_C$
(D) Ideal solution containing one mole each of A and B and 2 mole of C. $P_A^\circ > P_B^\circ > P_C^\circ$	(s) $Y_A = Y_C$
	(t) $Y_B > Y_C$