DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : CHEMISTRY
DPP No. : 9

Topic :- SOLUTIONS

1 **(b)**

$\pi V = nRT$

$\pi = \frac{n}{V}RT$

$\pi = CRT$

$\frac{\pi_1}{\pi_2} = \frac{C_1RT_1}{C_2RT_2}$

$\pi_1 = p, \pi_2 = 2atm\ C_1 = C,\ C_2 = \frac{C}{2}$

T_1=600 K, $T_2 = 700$ K

$\frac{P}{2} = \frac{2 \times C \times R \times 600}{C \times R \times 700}$

p=$\frac{24}{7}$

2 **(b)**

$$M = \frac{w \times 1000}{m \times V(\text{mL})} = \frac{75.5 \times 1000}{56 \times 540} = 2.50\ \text{M}$$

3 **(b)**

KNO_3 is a strong binary electrolyte. Its van't Hoff factor is 2. CH_3COOH is a very eak electrolyte . Its van't Hoff factor is less than that for KNO_3. Hence osmotic pressure of 0.1 M KNO_3 (Colligative molarity =0.1 M $\times$ 2)

$>$O.P. of 0.1 M CH_3COOH

(Colligative molarity is 0.1 M)

4 **(a)**

$P_M = P'_{\text{Benzene}} + P'_{\text{Toluene}}$

$$P_M = 75\ \times \frac{\frac{78}{78}}{\frac{78}{78} + \frac{46}{92}} + 22\ \times \frac{\frac{46}{82}}{\frac{78}{78} + \frac{46}{92}}$$

$$P_M = 75\ \times \frac{2}{3} + 22\ \times \frac{1}{2} \times \frac{2}{3}$$

$= 50 + 7.3 = 57.3$

Also $P'_A = 50$

5 **(b)**

Fusion requires heat (*i.e*, endothermic), thus freezing is exothermic.

6 **(b)**

$$K = \frac{a/1}{\frac{50-a}{1}} = 3;$$

$\therefore$ a (or acid in ether) = 37.5 ; acid in water = 12.5 g

7 **(b)**

Liquid mixtures showing positive deviations possess higher value of experimental vapour pressure than those obtained from Raoult's law.

8 **(a)**

Victor Meyer's method is used for volatile solutes. Rest all are used for non-volatile solute.

9 **(c)**

Both phase rule and distribution law are applied to heterogeneous systems.

10 **(a)**

$$\Delta T_b = \frac{1000 \times K_b \times w}{m \times W}(1 + \boldsymbol{\alpha})$$

$$\therefore \quad w = \frac{\Delta T_b \times m \times W}{1000 \times K_b(1+\alpha)} = \frac{4 \times 58.5 \times 1000}{1000 \times 0.52 \times 2}$$

$$= 225 \text{ g}$$

12 **(a)**

1. Van't Hoff equation is

$$\pi V = inRT$$

2. For depression in freezing point,

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

3. For elevation in boiling point,

$$\Delta T_b = i \times k_b \times m$$

4. For lowering of vapour pressure,

$$\frac{p^\circ{}_{\text{solvent}} - p_{\text{solution}}}{p^\circ{}_{\text{solvent}}} = i\left(\frac{n}{N+n}\right)$$

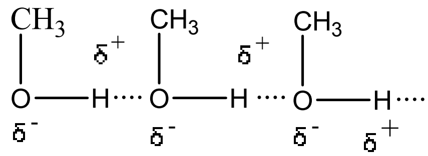
13 **(b)**

Water and hydrochloric acid; and water and nitric acid form miscible solutions. They show negative deviation.

In case of CH_3 COCH_3 and CHCl_3, there is interaction between them, thus force of attraction between CH_3COCH_3 .. $CHCl_3$ is larger than between $CHCl_3$.... $CHCl_3$ or CH_3 COC l_3... CH_3 COCH_3 and thus vapour pressure is less than expected. –a negative deviation.

In case of CH_3 OHthere is association by intermolecular h-bonding. When benzene is added to CH_3OH, H-bonding breaks and thus force of attraction between CH_3OH and benzene molecules is smaller than between CH_3OH or benzene molecules (in pure state).

Vapour pressure of mixture is greater than expected—a positive deviation.



14 **(d)**

Equivalent weight of

$$K_2Cr_2O_7 = \frac{\text{molecular weighty of } K_2Cr_2O_7}{\text{oxidation number of Cr}}$$

Oxidation number of Cr in $K_2Cr_2O_7$

$$2[+1]+2(x)+7(-2)= 0$$
$$2+2x-14 = 0$$
$$2x=12$$
$$x=6$$

$$\text{Equivalent weight} = \frac{294.19}{6} = 49.08$$

$$\frac{\text{weight of } K_2Cr_2O_7}{\text{equivalent wt.(E)}} = N \times V(L)$$

$$w = 0.1 \times 1 \times 49.03 = 4.903 \text{ g}$$

15 **(b)**

Lower is the b. p. of solvent more is its vapour pressure.

16 **(d)**

$K = c_1/c_2$

17 **(d)**

$$\pi V = \frac{w}{m} ST$$

$$\therefore \pi = \frac{w}{V} . \frac{ST}{m}$$

$$\pi = c' . \frac{ST}{m} (c' \text{ is in g/litre.})$$

The plots of π $vs.$ c (g/cm^3) have slope $= \frac{ST \times 1000}{m}$

$$\therefore \frac{ST \times 1000}{m} = 4.65 \times 10^{-3}$$

$$m = \frac{0.0821 \times 293 \times 1000}{4.65 \times 10^{-3}} = 5.17 \times 10^6$$

18 **(a)**

According to molarity equation

$$NaOH = HCl$$
$$M_1V_1 = M_2V_2$$
$$0.6 \times V_1 = 0.4 \times 30$$
$$V_1 = \frac{0.4 \times 30}{0.6} = 20cm^3$$

19 **(a)**

For non-electrolyte

$$\Delta T_f = k_f \times m$$

Given, m =0.05,

$\therefore$ $\Delta T_f = 1.86 \times 0.05 = 0.093$℃

Freezing point of solution

$k_f = 1.86 = 0 - \Delta T_f$

=0-0.093=-0.093℃

20 **(b)**

$$M = \frac{m \times d}{1 + \frac{mM_2}{1000}} = \frac{1 \times 1.21}{1 + \frac{1 \times 58.5}{1000}}$$

$$= \frac{1.21 \times 1000}{1000 + 58.5}$$

$= 1.143$ M

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	B	B	B	A	B	B	B	A	C	A
Q.	11	12	13	14	15	16	17	18	19	20
A.	C	A	B	D	B	D	D	A	A	B