DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : CHEMISTRY
DPP No. : 7

Topic :- SOLUTIONS

1 **(c)**

The extraction is more efficient when little volume of extracting liquid is used for large number of operations.

2 **(b)**

Normality of acid = Molarity × basicity

$= 2 \times 2 = 4$ N

3 **(a)**

$CuCl_2$ is an electrolyte which ionise in solution as follows.

$$CuCl_2 \rightleftharpoons Cu^{2+} + 2Cl^-$$

At t=0 1 mole 0 0

After ionisation $(1-\alpha)mole$ $\alpha mole$ $2\alpha mole$

Thus, number of particles after ionisation

$=1-\alpha+\alpha+2\alpha = 1+2\alpha$

$\therefore$ van,t Hoff factor (i)

$$= \frac{\text{number of particloes after ionisation}}{\text{number of particles before ionisation}}$$

$or \quad (i) = \frac{1+2\alpha}{1}$ (On 100 % ionisation α = 1)

$$= \frac{1+2\times 1}{1} = 3$$

The elevation in boiling point (when colligative property is abnormal)

$\Delta T^b = i \times k_b \times m$

$m \rightarrow$ molality of solution

Molality of $CuCl_2$ solution

$$\frac{\frac{\text{weight of } CuCl_2 \text{ in gram}}{\text{mol.weight of } CuCl_2}}{\text{weight of water (solvent) in kg}} = \frac{\frac{13.44}{134.4}}{1} = 0.1 \text{ m}$$

Thus, $\Delta T_b = 3 \times 0.52 \times 0.1 = 0.156 \approx 0.16$°C

4 **(a)**

$A_xB_y \rightleftharpoons xA^{y+} + yB^{x-}$

After dissociation (1-α) $x\alpha$ $y\alpha$

i=n(A_xB_y)+n(A^{y+}) + $n(B^{x-})$

=2-α+x $\alpha + y\alpha = 1 + \alpha(x + y - 1)$

$\therefore \quad \alpha = \frac{i-1}{(x+y-1)}$

5 **(a)**

According to Raoult's law

$$\frac{p - p_s}{p} = x_{\text{solute}}$$

Where, p= vapour pressure of pure solvent =0.80 atm

$p_s =$ vapour pressure of solute =0.60 atm

$X_{\text{solute}} =$ mole fraction of solute

$$\frac{0.80 - 0.60}{0.80} = X_{\text{solute}}$$

or $$\frac{0.20}{080} = X_{\text{solute}}$$

$$x_{solute} = 0.25$$

6 **(d)**

These are characteristics which reflect for high solubility of gases in water. It is therefore S O_2 and NH_3 having lower critical temperature or easily liquefied, HCl which ionises in water and CO_2 which reacts with water are more soluble.

7 **(d)**

In osmosis only solvent particles move.

8 **(d)**

Given, $T_b - T_f = 105.0°C$

$\Rightarrow \quad (100 = \Delta T_b) - (0 - \Delta T_f) = 105.0°C$

$\Delta T_b + \Delta T_f = 5$

$\Delta T_b + \Delta T_f (k_b + k_f) \times m$ (m =molality)

$\Rightarrow \quad 5 = (1.86 \times 0.51) \times \frac{w \times 1000}{342 \times 100}$

$\therefore \quad w = \frac{1710}{23.7} = 72\ g$

9 **(a)**

Due to higher pressure inside the boiling point elevated

10 **(a)**

$$M = \frac{w \times 1000}{\text{mol. mass} \times \text{volume in mL}}$$

$$= \frac{9.8 \times 1000}{98 \times 2000} = 0.05\ \text{M}$$

11 **(c)**

$$K = \frac{4.412}{0.0156} = \frac{s}{0.34}$$

$$\therefore \ S = \frac{4.412 \times 0.34}{0.0156}$$

12 **(b)**

pH $= -\log[H^+]$

$\log[H^+] = -\text{pH} = 0.00$

$[H^+]$=antilog(0.00)

$[H^+] = 1.0$ M

M H_2SO_4 = $2NH_2SO_4$

$\therefore$ Normality of 250mL solution $= \frac{2 \times 250}{1000}$

$= 0.50$ N

13 **(c)**

Benzoic acid in benzene exists as a dimer. So, number of molecules decreases and hence, osmotic pressure decreases.

14 **(b)**

$K = 420 = \frac{5 - x}{x}$

$\therefore\ x = 0.0119$ g

15 **(a)**

If mol. wt. is high, ΔT_f, ΔT_b and ΔP will be too small to read out accurately.

16 **(d)**

Van't Hoff factor (i) is given by

$$i = \frac{\text{observed value of colligative property}}{\text{normal value of colligative property}}$$

The normal value of colligative property is the theoretically calculated value assuming no association or dissociation.

$\therefore \quad i = \frac{\pi_{obs}}{\pi_{cal}}$

17 **(c)**

$P_m = P_A^0 X_A + P_B^0 X_B$

$P_m = 1000 \times \frac{2}{5} + 80 \times \frac{3}{5}$

$= 40 + 48 = 88$ torr

18 **(b)**

Alcohol involves H-bonding; also mol. wt. of CH_4 > mol.wt. of H_2. Greater is molecular weight of covalent compound, higher is its b.p.

19 **(b)**

Lesser is ΔT_f, more is freezing point.

20 **(a)**

Liquid mixtures showing positive deviations from Raoult's law posses lower b. p.

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