

DPP

DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

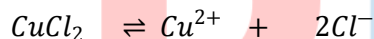
SUBJECT : CHEMISTRY
DPP No. : 7

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 \times basicity
 $= 2 \times 2 = 4 \text{ N}$

3 (a)
 CuCl_2 is an electrolyte which ionise in solution as follows.



At $t=0$ 1 mole 0 0
After ionisation $(1-\alpha)$ mole α mole 2α mole
Thus, number of particles after ionisation
 $= 1-\alpha + \alpha + 2\alpha = 1 + 2\alpha$

$$\therefore \text{van,t Hoff factor } (i) = \frac{\text{number of particles after ionisation}}{\text{number of particles before ionisation}}$$

$$\text{or } (i) = \frac{1 + 2\alpha}{1} \quad (\text{On } 100\% \text{ ionisation } \alpha = 1)$$
$$= \frac{1 + 2 \times 1}{1} = 3$$

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

$$\frac{\text{weight of CuCl}_2 \text{ in gram}}{\text{mol. weight of CuCl}_2} = \frac{13.44}{134.4} = 0.1 \text{ m}$$
$$\frac{\text{weight of water (solvent) in kg}}{1} = 1$$

$$\text{Thus, } \Delta T_b = 3 \times 0.52 \times 0.1 = 0.156 \approx 0.16^\circ\text{C}$$

4 (a)
 $A_x B_y \rightleftharpoons xA^{y+} + yB^{x-}$
After dissociation $(1-\alpha)$ $x\alpha$ $y\alpha$

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

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

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

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(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_{solute} = mole fraction of solute

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

or

$$\frac{0.20}{0.80} = X_{\text{solute}}$$

$$x_{\text{solute}} = 0.25$$

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, $T_b - T_f = 105.0^\circ\text{C}$

$$\Rightarrow (100 = \Delta T_b) - (0 = \Delta T_f) = 105.0^\circ\text{C}$$

$$\Delta T_b + \Delta T_f = 5$$

$$\Delta T_b + \Delta T_f (k_b + k_f) \times m \quad (\text{m} = \text{molality})$$

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

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

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(a)

Due to higher pressure inside the boiling point elevated

10

(a)

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

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

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(c)

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

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

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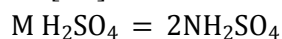
(b)

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

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

$$[\text{H}^+] = \text{antilog}(0.00)$$

$$[H^+] = 1.0 \text{ M}$$



$$\begin{aligned}\therefore \text{Normality of 250mL solution} &= \frac{2 \times 250}{1000} \\ &= 0.50 \text{ N}\end{aligned}$$

13 **(c)**

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

14 **(b)**

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

$$\therefore x = 0.0119 \text{ g}$$

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.

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

17 **(c)**

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

$$\begin{aligned}P_m &= 1000 \times \frac{2}{5} + 80 \times \frac{3}{5} \\ &= 40 + 48 = 88 \text{ torr}\end{aligned}$$

18 **(b)**

Alcohol involves H-bonding; also mol. wt. of $\text{CH}_4 >$ 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 possess 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

PE