



DPP SOLUTION

- Subject – Physical Chemistry
- Chapter – Some Basic Concept of Chemistry

DPP No.- 10

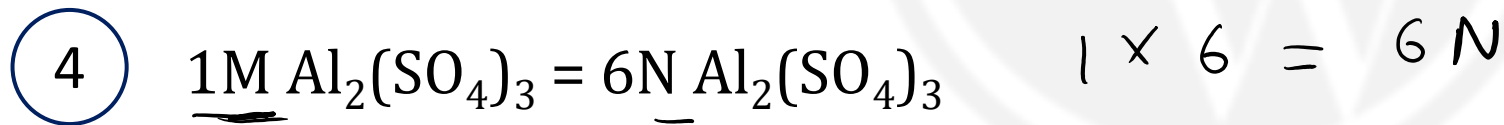
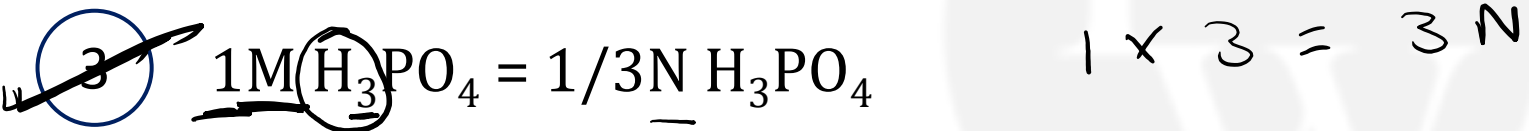
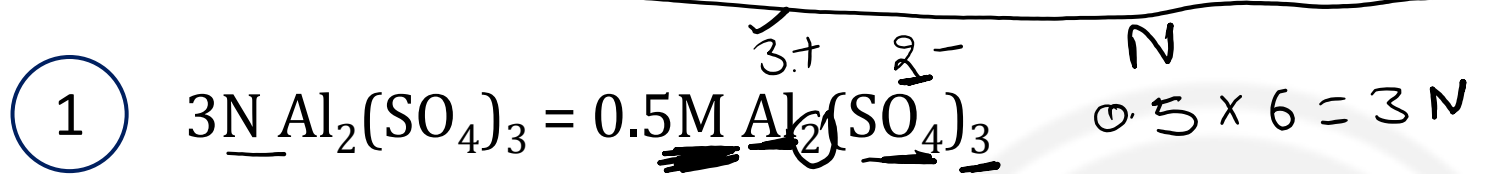


By – Amit Mahajan Sir

Question-



Which of the following relations is incorrect for solutions?



$$N = M \times n_f$$

Ans. (3)

Question-



Determine the volume/volume percent solution made by combining 25 mL of ethanol with enough water to produce 200 mL of the solution. (Gram atomic mass of C = 12 g, O = 16 g and H = 1 g)

☒ 12.5 % of v/v = $\frac{\text{Volume of solute}}{\text{solution}} \times 100$

☐ 20

☐ 40

☐ 25

$$= \frac{25}{200} \times 100 = 12.5 \%$$

Ans. (1)

Question-



250 ml of 0.5M KCl is diluted with water to 500 ml of solution, the number of chloride ions in the resulting solution are (Gram atomic mass of K = 39 g and Cl = 35.5 g)

1 6.02×10^{23} $V_1 = 250 \text{ ml}$ $V_2 = 500 \text{ ml}$

~~2~~ 7.52×10^{22} $M_1 = 0.5 \text{ M}$ $M_2 = ?$

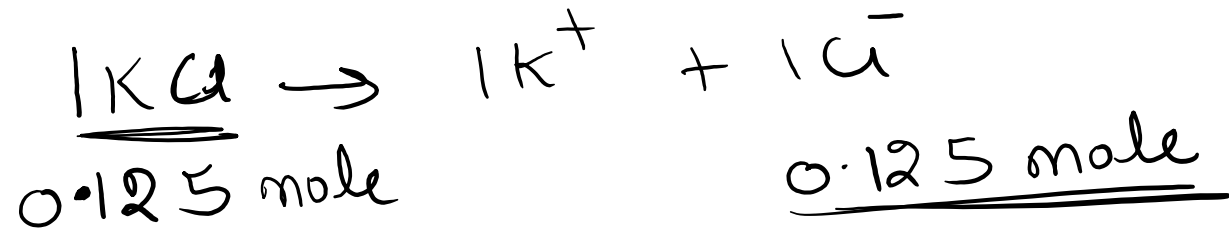
3 1×10^{24} $M_1 V_1 = M_2 V_2$
 $0.5 \times 250 = M_2 \times 500$

4 3.76×10^{23} $M_2 = \frac{0.5}{2} = 0.25 \text{ M KCl}$

0.25 moles KCl present in 1000 ml of solution.

100 ml, moles = 0.25
 $\frac{0.25 \times 500}{1000} = 0.125 \text{ moles}$

Ans. (2)



$$0.125 \text{ mole} = N_A \times 0.125$$

$$= \frac{3}{4} \times 10^{23} \times \frac{125}{1000} \quad 84$$

$$= \frac{3}{4} \times 10^{23}$$

$$= 0.75 \times 10^{23}$$

$$= 7.5 \times 10^{22}$$

Question-



What is the quantity of ^{solvent} water that should be added to 16 g methanol to make the mole fraction of methanol as 0.25? (Gram atomic mass of C = 12 g, O = 16 g, H = 1 g)

$\text{CH}_3\text{OH} \rightarrow \text{solute}$

g)

~~1~~ 27 g

2 12 g

3 18 g

4 36 g

$$W_A = ?$$

$$M_A(\text{H}_2\text{O}) = 18 \text{ g/mol}$$

$$W_B = 16 \text{ g}$$

$$M_B(\text{CH}_3\text{OH}) = 12 + 4 + 16 = 32 \text{ g/mol}$$

$$\%B = 0.25 = \frac{n_B}{n_A + n_B}$$

$$n_B = \frac{16}{32} = 0.5$$

$$n_A + 0.5 = 2$$

$$n_A = 2 - 0.5 = 1.5$$

$$\frac{W_A}{M_A} = 1.5$$

$$W_A = 18 \times 1.5 = 27 \text{ g}$$

$$\frac{\%B}{\%A} = \frac{n_B}{n_A}$$

$$\frac{25}{100} = \frac{1}{n_A + 0.5}$$

$$\Rightarrow W_A = 0.5 \times 18 \times 3 = 27 \text{ g}$$

$$\frac{0.25}{0.75} = \frac{0.5 \times 18}{W_A}$$

Ans. (1)

Question-



Mole fraction of the solute in a 1.00 molal aqueous solution is

$$M_A(\text{H}_2\text{O}) = 18 \text{ g/mol}$$

$$\%B = ?$$

$$m = \frac{\%B \times 1000}{\%A \times M_A}$$

$$1 = \frac{\%B \times 1000}{(1 - \%B) \times 18}$$

$$18 - 18 \%B = 1000 \%B$$

$$1018 \%B = 18$$

$$\%B = \frac{18}{1018} = 0.0177$$

$$\frac{2.4}{102.4} = \frac{1}{50.1}$$

$$\frac{1}{50.1} = 0.02$$

1 0.1770

~~2~~ ~~0.0177~~

3 0.0344

4 1.7700

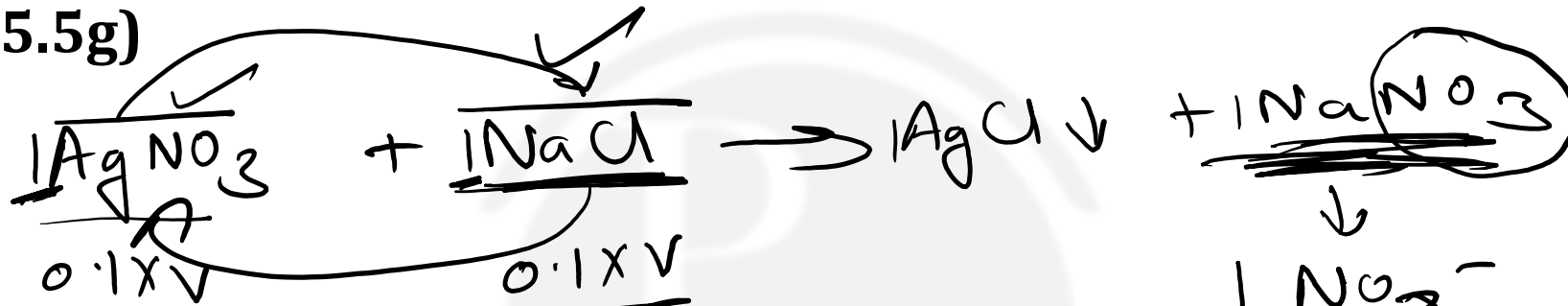
Ans. (2)

Question-



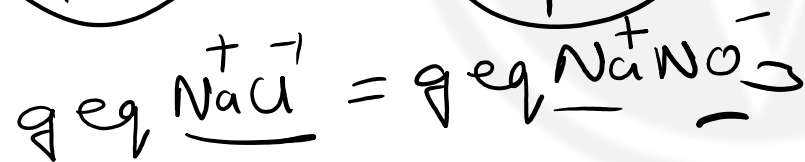
What is the concentration of nitrate ions if equal volumes of 0.1 M AgNO_3 and 0.1 M NaCl are mixed together? (Gram atomic mass of Ag = 108 g, N = 14 g, O = 16 g, Na = 23 g, Cl = 35.5g)

- 1 0.1 M
- 2 0.2 M
- ~~3 0.05 M~~
- 4 0.25 M



$$\frac{0.1V}{1}$$

$$\frac{0.1V}{1}$$



$$0.1 \times V \times 1 = \text{moles} \times 1$$

$$\text{moles} = 0.1V = \text{moles } \text{NaNO}_3$$

$$\frac{M}{1} = \frac{n}{V(L)}$$

$$n = M \times V(L)$$

$$[\text{NO}_3^-] = M_{\text{NO}_3^-} = \frac{0.1V}{2V}$$

$$= 0.05 \text{ M}$$

Ans. (3)

Question-



The molarity of the solution containing 2.8% mass-volume solution of KOH is

(Gram atomic mass of K = 39 g, O = 16 g, H = 1 g)

2.8 g solute (KOH) present in 100 ml solution | $M_{KOH} = 39 + 16 + 1 = 56 \text{ g}$

1 M/10

$$M = \frac{n_B}{V(L)} = \frac{2.8 \times 1000}{56 \times 100} = \frac{28}{56} = \frac{1}{2} \text{ M}$$

~~2~~ M/2

3 M/5

4 1M

2.8 g 100 ml

Ans. (2)

Question-

$$[\text{OH}^-] = M_{\text{OH}^-}$$



What is the $[\text{OH}^-]$ the final solution prepared by mixing 20.0 mL of 0.050M HCl with 30.0 mL of 0.10M $\text{Ba}(\text{OH})_2$?

1	0.10M	$\text{HCl} + \text{Ba}(\text{OH})_2 \rightarrow \text{BaCl}_2 + \text{H}_2\text{O}$
2	0.40M	milli g. eq left = $ 20 \times 0.05 \times 1 - 30 \times 0.10 \times 2 $
3	0.0050M	millieq $\text{OH}^- = 1 - 6 = 5$
4	0.12M	$N_{\text{OH}^-} = \frac{5}{50} = \frac{1}{10} = 0.1 \text{ N}$
		$M_{\text{OH}^-} = \frac{N_{\text{OH}^-}}{n_{\text{factor OH}^-}} = \frac{0.1}{1} = 0.1 \text{ M}$

Ans. (1)

Question-



The molality of a sulphuric acid solution is 0.2. Calculate the total weight of the solution having 1000 gm of solvent. (Gram atomic mass of S = 32 g, O = 16 g, H = 1 g)

- 1 1000 g
- 2 1098.6 g
- 3 980.4 g
- ~~4~~ 1019.6 g

$$m_{\text{H}_2\text{SO}_4} = 0.2$$
$$W_A = 1000 \text{ g}, M_B(\text{H}_2\text{SO}_4) = 98 \text{ g/mol}$$
$$\text{mass of sol}^n = W_A + W_B$$
$$= 1000 + 19.6$$
$$= 1019.6 \text{ g}$$

0.2 mole of H_2SO_4
present in 1000 g of solvent

$$n_B = 0.2 = \frac{W_B}{M_B}$$

$$W_B = \frac{0.2}{10} \times 98 = \frac{19.6}{10} = 19.6 \text{ g}$$

Ans. (4)

Question-



The density (in g mL^{-1}) of a 3.60 M sulphuric acid solution that is 29% (H_2SO_4 molar mass = 98 g mol^{-1}) by mass will be :

☒ 1.22

☐ 2.1.45

☐ 3.1.64

☐ 4.1.88

$$M = 3.6 \text{ M}$$

$$\% \text{ by mass} = 29 \%$$

$$d \text{ of sol}^n = ?$$

$$M = \frac{\% \text{ by mass} \times d \times 10}{M_B}$$

$$3.6 = \frac{29 \times d \times 10}{98}$$

$$\frac{98 \times 3.6}{29 \times 100} = d = 1.22 \text{ g/mL}$$

$$\frac{36}{29} \approx \frac{35}{28} = \frac{5}{4} = 1.25$$

Ans. (1)

Question-



How many significant figures are in 0.0008?

☒ 1

☐ 2

☐ 3

☐ 4



Ans. (1)

Question-

The multiple 5×0.2 after rounding off will be

- ☒ 1
- ☐ 1.0
- ☐ 1.00
- ☐ 1.000

Ans. (1)

Question-



Add (0.001 + 0.02) upto the correct number of significant figures

1 0.021

$$\begin{array}{r} 0.001 \\ 0.02 \\ \hline 0.021 \end{array}$$

~~2~~ 0.02

3 0.003

4 0.001

Ans. (2)

Question-



One fermi is

$$1 \text{ fermi} = 10^{-15} \text{ m} = 10^{-15} \times 100 \text{ cm} = 10^{-13} \text{ cm}$$

☒ 1 10^{-13} cm

☐ 2 10^{-15} cm

☐ 3 10^{-10} cm

☐ 4 10^{-12} cm



Ans. (1)

Question-



Significant figures in 0.00051 are

① 5

② 3

~~③ 2~~

④ 4



Ans. (3)

Question-

1 m³ is equal to

- 1 100 litre
- 2 10000 litre
- 3 10 litre
- ~~4 1000 litre~~

$$1 \text{ m}^3 = 10^3 \text{ dm}^3$$

$$1 \text{ m} = 10 \text{ dm}$$

$$1 \text{ m} \times 1 \text{ m} \times 1 \text{ m} = 10 \text{ dm} \times 10 \text{ dm} \times 10 \text{ dm} =$$

$$1 \text{ m}^3 = 10^3 \text{ dm}^3 \\ = 10^3 \text{ L}$$

$$1 \text{ dm}^3 = 1 \text{ L}$$



Ans. (4)

Question-



A picometre is written as

$$1 \text{ pm} = 10^{-12} \text{ m}$$

1 10^{-9} m

2 10^{-10} m

3 10^{-11} m

4 10^{-12} m

Ans. (4)

Question-



Convert 25365 mg to S.I. unit

- ① 253.65 g
- ☒ ② $25.365 \times 10^{-3} \text{ kg}$
- ③ 25.365 kg
- ④ 253.65 kg

$$25365 \text{ mg} = \frac{25365 \text{ g}}{1000}$$

$$= \frac{25365}{\underbrace{(1000) \times 1000}} \text{ Kg}$$

$$= 25.365 \times 10^{-3} \text{ Kg}$$

$$\underline{1 \text{ Kg}} = \underline{1000 \text{ g}}$$

Ans. (2)



Thank

You...

