YAKEEN NEET 2.0

2026

Some Basic Concept of Chemistry

Physical Chemistry | Lecture -11

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Topics to be covered

1. Revision of Last Class
2. Concentration terms
3. Relation Between different Concentration Terms
4. Home work from modules , MPQ

Rules to Attend Class

1. Always sit in a peaceful environment with headphone and be ready with your copy and pen.
2. Never ever attend a class from in between or don't join a live class in the middle of the chapter.
3. Make sure to revise the last class before attending the next class & always complete your Magarmach Practice Questions.
4. Never ever engage in chat whether live or recorded on the topic which is not being discussed in current class as by doing so u can be blocked by the admin team or your subscription can be cancelled.

Rules to Attend Class

5. Try to make maximum notes during the class if something is left then u can use the notes pdf after the class to complete the remaining class.
6. Always ask your doubts in doubt section to get answer from faculty. Before asking any doubt please check whether same doubt has been asked by someone or not.

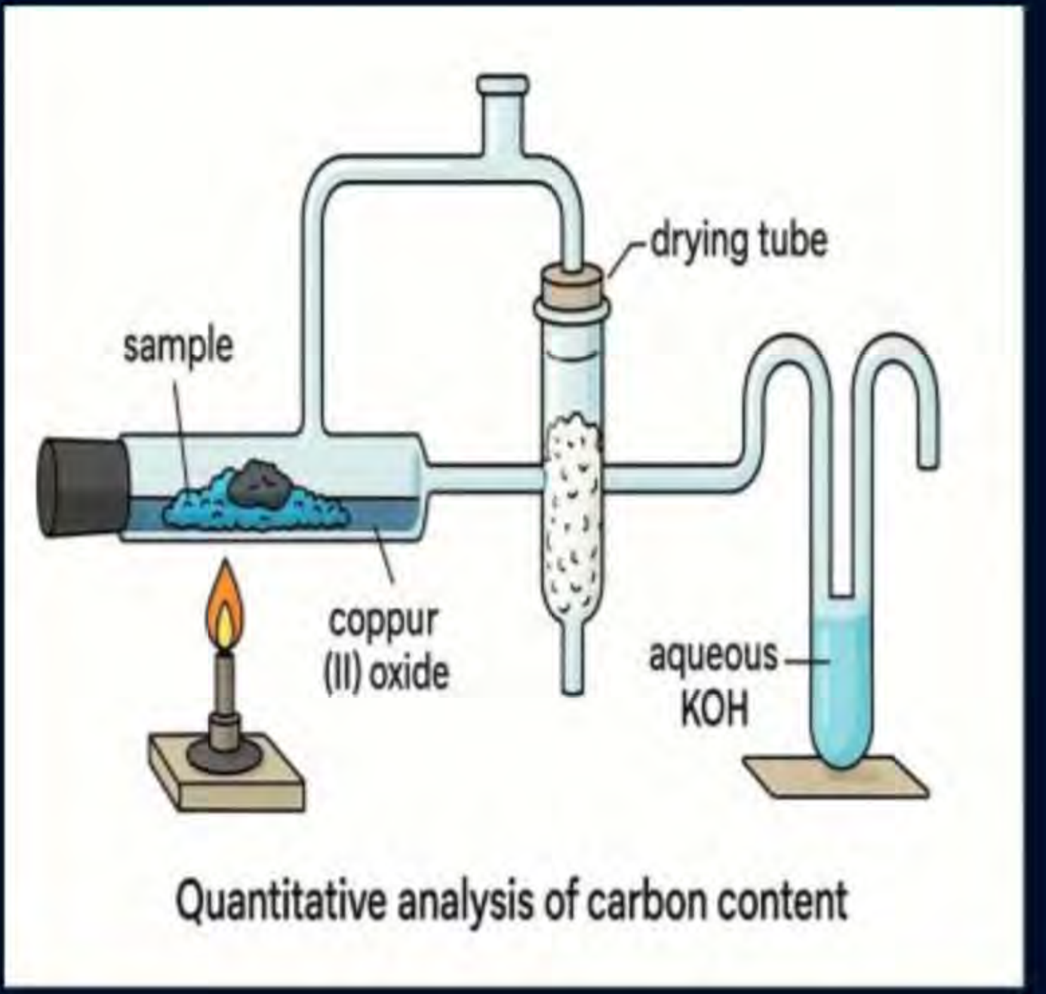

There is one big flaw in your Preparation that's name is Backlog ? What do we say to Backlog ?
NOT TODAY !!!

Revision of Last class

$$\% \text{ of } C = \frac{12}{44} \times \frac{\text{mass of } CO_2}{\text{mass of O.C.}} \times 100$$

$$\% H = \frac{2}{18} \times \frac{\text{mass of } H_2O}{\text{O.C.}} \times 100$$

$$\% O = 100 - [\% \text{ of } C + \% \text{ of } H]$$



Quantitative analysis of carbon content

SUMMARY

Pure substances are rare in everyday life

Most materials are mixtures of two or more pure substances

Usefulness of mixtures depends on their composition

Brass: mixture of copper and zinc

German silver: mixture of copper, zinc, and ad nickel

Bronze: mixture of copper and in

Topics covered in the unit:

- Properties of solutions such as vapour pressure and colligative propeerties
- Types of solutions

Fluoride in water:

1 ppm helps prevennt tooth decay

1.5 ppm or higher causes mottled teeth

High concentrations can be poisonous

Intravenous (IV) injections:

Must match blood plasma ionic concentrations

Focus of the unit:

Discusses liquid solutions and their formation

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Discusses liquid solutions and their formation

$\% \text{ by Volume} = \frac{V_B}{V} \times 100$

$\% \text{ by mass} = \frac{W_B}{W} \times 100$

1. By strength $= \frac{W_B}{V} \times 100$

Molarity (M)

1 L solution → n_B

$$M = \frac{n_B}{V(L)}$$

unit of M = mol/L or molar or M

$$1ml = 1cm^3 = 1c \cdot c \cdot = \frac{1}{1000}$$

Moles of Solute (n_B)	Volume of solution in Litre	Molarity
6 ← 3 L 2 = 6/3 ← 1 L		$2\,M = \frac{n_B}{V(L)}$
2	1	$M = \frac{2}{1} = 2M$
4	4	$M = \frac{4}{4} = 1$
7	14	$M = \frac{7}{14} = \frac{1}{2} = 0.5M$
6	3	$M = \frac{6}{3} = 2M$
9	3	$M = \frac{9}{3} = 3M$
12	4	$M = \frac{12}{4} = 3M$
18	3	$M = \frac{18}{3} = 6M$

Question

Calculate the molarity of NaOH in the solution prepared by dissolving its 4 g in enough water to form 250 mL of the solution. If molar mass of NaOH is 40 g.

Ans $M_{NaOH} = \frac{n_B}{V(L)} = \frac{1 \times 4}{10 \times 1} = \frac{2}{5} = 0.4M$

$W_B = 4g$
$M_B = 40g$
$\Rightarrow n_B = \frac{4}{40} = \frac{1}{10}$

$V = 250ml = \frac{250}{1000} L = \frac{1}{4} L.$

QUESTION (JEE Main 27-01-2024, Shift-II)

Volume of 3 M NaOH (formula weight 40 g mol^{-1}) which can be prepared from 84 g of NaOH is ___7___ × 10^{-1} dm^3.

$1 dm^3 = 1 L$

$M = 3M$

$w_B = 84 g$

$M_B = 40 g$

$V = ?$

$$M = \frac{n_B}{V(L)}$$

$$V(L) = \frac{n_B}{M} = \frac{84}{40 \times 3} = 0.7 L = 7 \times 10^{-1} dm^3$$

QUESTION (NEET PYQ)

6.02 × 10^{20} molecules of urea are present in 100 mL of its solution. The concentration of urea solution is:

molecules = 6.02×10^{20}

A. 0.001 M

B. 0.01 M

C. 0.02 M

D. 0.1 M

$V(ml) = 100\,ml$

$= \frac{100}{1000} L = 0.1 L$

$M = \frac{n_B}{V(L)} = \frac{6.02 \times 10^{20} \times 10}{6.02 \times 10^{23} \times 0.1} = \frac{1}{100} = 0.01 M$

1000

Question (NCERT: PL-23 | JEE Main Jan. 10, 2019 (II))

The amount of sugar ($C_{12}H_{22}O_{11}$) required to prepare 2 L of its 0.1 M aqueous solution is :

(A) 136.8 g

(B) 17.1 g

(C) 68.4 g

(D) 34.2 g

$M = 0.1M$

$V = 2L.$

$w_B = ?$

$M_B = 342g.$

$M = \frac{w_B}{342 \times 2} = 0.1$

$w_B = 684 \times 0.1 = 68.4g$

Formality (F)

Molarity of solute = ionic Compd.

$$M = F = \frac{W_B}{F_B \; V(L)}$$

F_B = Formula mass = M_B

Question

How many grams of NaOH should be dissolved to make 100 cm^3 of 0.15 F NaOH solution? If gram formula mass of NaOH is 40 g.

Ans $w_B = ?$ $M_B = F_B = 40g$.

$V(ml) = 100ml = \frac{100}{1000} L$

$F = 0.15 F = \frac{w_B \times 1}{4g \times 1}$

$w_B = 0.15 \times 4 = 0.60 g$

Molality (m)

1 Kg solvent has n_B

$$m = \frac{n_B}{W_A \text{ (in Kg)}}$$

$$1g = \frac{1}{1000} Kg$$

unit of m = mol/Kg or Molal or m

Moles of Solute (n_B)	Mass of solvent in Kg	Molality
6 ← 2 m = 6/2 = 3 ← 1		$m = \frac{6}{2} = 3m$
12	6	$m = \frac{12}{6} = 2m$
18	6	$m = \frac{18}{6} = 3m$
30	5	$30/5 = 6m$
24	2	$24/2 = 12m$
10	1	$10/1 = 10m$
9	3	$9/3 = 3m$
20	10	$90/10 = 2m$

Question

B

If 160 g of NaOH is present in 500 ml of water, find molality if Molar mass of NaOH is 40 g.

Ans $m = \frac{n_B}{w_A(kg)} = \frac{4 \times 2}{1} = 8\,m$

$n_B = \frac{160}{40} = 4$

$w_A = V_A \times d_A$

$w_A = 500 \times 1 = 500\,g.$

$= \frac{500}{1000} = \frac{1}{2}\,kg.$

Question

The molality of a urea solution in which 0.0100 g of urea, $[(NH_2)_2CO]$ is added to 0.3000 dm^3 of water at STP is

(A) 5.55×10^{-4} m

(B) 33.3 m

(C) 3.33×10^{-2} m

(D) 0.555 m

Ans $m = \frac{n_B}{w_A(kg)} = \frac{0.01 \times 1000}{60 \times 300} = \frac{1}{3 \times 6} \times 10^{-2} = 0.055 \times 10^{-2}$ m

$w_B = 0.01$ g

$M_B = 60$ g

$V = 0.3\ dm^3 = 0.3\ L = 300$ ml

$w_A = V_A(ml) \times d_A(g/ml)$

$= 300 \times 1 = 300$ g

$= \frac{300}{1000} = \frac{3}{10}$ kg

QUESTION (JEE 1986)

A molal solution is one that contains one mole of a solute in

1000 g of solvent.

(A) 1000 g of the solvent

(B) One litre of the solvent

(C) One litre of the solution

(D) 22.4 litres of the solution

Mole fraction (X)

fraction → moles of Component / Total moles.

Solvent → n_A

Solute → n_B

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(Chi) χ_B or $x_B = \dfrac{n_B}{n_A + n_B}$

χ_A or $x_A = \dfrac{n_A}{n_A + n_B}$

Unit less.

$\dfrac{\chi_B}{\chi_A} = \dfrac{n_B}{n_A}$

Binary Sol^n.

$\chi_A + \chi_B = 1$

$\chi_B = 1 - \chi_A$

$\dfrac{\chi_B}{\chi_A} = \dfrac{n_B}{n_A} = \dfrac{\text{moles of } B}{A}$

$\dfrac{\chi_B}{\chi_A} = \dfrac{n_B(n_A + n_B)}{(n_A + n_B) \times n_A}$

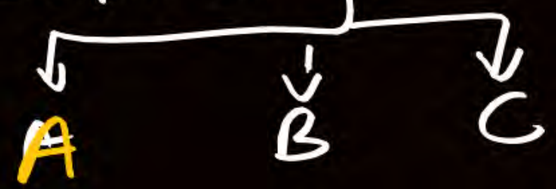
Binary solution → 2 Component Sol^n

$\chi_A + \chi_B = 1$

$\dfrac{n_A}{n_A + n_B} + \dfrac{n_B}{n_A + n_B} = 1$

$\dfrac{n_A + n_B}{n_A + n_B} = 1$

3 Component soln.



$$\chi_A + \chi_B + \chi_C = 1$$

$$\frac{n_A}{n_A+n_B+n_C} + \frac{n_B}{n_A+n_B+n_C} + \frac{n_C}{n_A+n_B+n_C} = 1$$

$$\frac{n_A + n_B + n_C}{n_A+n_B+n_C} = 1$$

Moles of Solute (n_B)	Moles of Solvent (n_A)	Mole Fraction (χ)
5	10	$\chi_B = \frac{5}{5+10} = \frac{5}{15} = \frac{1}{3}$ | $\chi_A = 1 - \chi_B = 1 - \frac{1}{3} = \frac{2}{3}$
2	10	$\chi_B = \frac{2}{12} = \frac{1}{6}$ | $\chi_A = 1 - \frac{1}{6} = \frac{5}{6}$
5	15	$\chi_B = \frac{5}{20} = \frac{1}{4}$ | $\chi_A = \frac{3}{4}$
4	12	$\chi_B = \frac{4}{16} = \frac{1}{4}$ | $\chi_A = \frac{3}{4}$
3	12	$\chi_B = \frac{3}{15} = \frac{1}{5}$ | $\chi_A = \frac{4}{5}$

Question

If 3 moles of water is mixed with 1 mole of sugar. Find mole fraction of water and sugar?

Ans: $\chi_A = \frac{3}{4}$

$\chi_B = 1 - \frac{3}{4} = \frac{1}{4}$

Question (NCERT: PL-23 | JEE Main Jan. 12, 2019 (II))

8 g of NaOH (B) is dissolved in 18 g of H_2O (A). Mole fraction of NaOH in solution and molality (in mol kg^{-1}) of the solution respectively are :

(A) 0.2, 22.20

(B) 0.2, 11.11

(C) 0.167, 11.11

(D) 0.167, 22.20

$$\chi_B = \frac{0.2}{0.2+1} = \frac{0.2}{1.2} = \frac{1}{6} = 0.167$$

$$m = \frac{n_B}{w_A(kg)} = \frac{0.2 \times 1000}{18} = \frac{55.55 \times 2}{10} = 11.11$$

$$n_B = \frac{8}{46} = \frac{1}{5} = 0.2$$

$$n_A = \frac{18}{18} = 1$$

$$w_A = 18\,g$$

QUESTION (JEE Main 30-01-2024, Shift-II)

If a substance 'A' dissolves in solution of a mixture of 'B' and 'C' with their respective number of moles as n_A, n_B and n_C. Mole fraction of C is in the solution is

$$\chi_C = \frac{n_C}{n_A + n_B + n_C}$$

(A) $\frac{n_C}{n_A \times n_B \times n_C}$

(B) $\frac{n_B}{n_A + n_B}$

(C) $\frac{n_C}{n_A + n_B + n_C}$

(D) $\frac{n_c}{n_A - n_B - n_C}$

Question

$C_6H_{12}O_6 \Rightarrow M_B = 180\ g/mol$

Find molality of 20% w/v of glucose if density of solution is 2g/ml.

Ans $m = \dfrac{n_B}{w_A\,(Kg)} = \dfrac{1 \times 1000}{9 \times 18} = \dfrac{5.55}{9}$

20% (w/V)

20g solute present in 100ml of solution.

d of soln = 2g/ml

$n_B = \dfrac{2}{18} = \dfrac{1}{9}$

$w = w_A + w_B$

$100 \times 2 = w_A + 20$

$w_A = 200 - 20 = 180\ g.$

Relation Between Mole Fraction (x) & Molality (m)

$$m = \frac{n_B \times 1000}{\frac{w_A(g)}{M_A} \times M_A}$$

$$= \frac{n_B \times 1000}{n_A \times M_A}$$

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$$m = \frac{x_B \times 1000}{x_A \times M_A}$$

Question

H_2O → solvent

B

A 5.2 molal aqueous solution of methyl alcohol, CH_3OH, is supplied. What is the mole fraction of methyl alcohol in the solution?

1. 0.100
2. 0.190
3. 0.086
4. 0.050

m = 5.2 → 5.2 moles solute present in 1000g solvent (H_2O)

$$\chi_B = \frac{n_B}{n_A + n_B}$$

$$= \frac{5.2}{5.2 + 55.55}$$

$$= \frac{5.2}{60.75}$$

$$n_A = \frac{1000}{18} = 55.55$$

$$5.2 = \frac{\chi_B \times 1000}{(1-\chi_B) \times 18}$$

$$5.2 = \frac{55.55\chi_B}{1-\chi_B}$$

$$5.2 - 5.2\chi_B = 55.55\chi_B$$

$$5.2 = 60.75\chi_B$$

$$\chi_B = \frac{5.2}{60.75}$$

Question

The mole fraction of a solvent in aqueous solution of a solute is 0.8. The molality (in mol kg^{-1}) of the aqueous solution is

1. 13.88×10^{-2}
2. 13.88×10^{-1}
3. 13.88 ✓
4. 13.88×10^{-3}

$x_A = 0.8$
$x_B = 0.2$

$\rightarrow \frac{x_B}{x_A} = \frac{0.2}{0.8} = \frac{1}{4} = \frac{n_B}{n_A}$

$\frac{n_B \times 18}{w_A} = \frac{1}{4}$

$\frac{n_B}{w_A} = \frac{1}{72}$

$m = \frac{n_B \times 1000}{w_A(g)}$

$= \frac{1}{72} \times 1000 = 13.88$

Relation Between Mole Fraction (x) & Molality (m)

$$M = \frac{n_B}{V(L)}$$

$$= \frac{n_B \times n_A}{n_A \times V(L)}$$

$$M = \frac{x_B \times n_A}{x_A \times V(L)}$$

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CHAPTER kab khatam hoga?

↕

LAST (last main)

Magarmach Practice Questions (MPQ)

AGENT MAGARMACH.

Question

100 g of propane is completely reacted with 1000 g of oxygen. The mole fraction of carbon dioxide in the resulting mixture is $x \times 10^{-2}$. The value of x is ..... .
(Nearest integer) [Atomic weight: H 1.008, C = 12.00, O = 16.00]

Question

Wood's metal contains 50.0% bismuth, 25.0% lead, 12.5% tin and 12.5% cadmium by weight. What is the mole fraction of tin?

(Atomic weights: Bi = 209, Pb = 207, Sn = 119, Cd = 112)

A 0.202

B 0.158

C 0.176

D 0.221

Question (NCERT: PL-23 | JEE Mains)

A commercially sold conc. HCl is 35% by mass. If the density of this commercial acid is 1.46 g/mL, the molarity of this solution is :
(Atomic mass : Cl = 35.5 amu, H = 1 amu)

(A) 10.2 M

(B) 12.5 M

(C) 14.0 M

(D) 18.2 M

Question (NCERT: PL-18 | NV, JEE Main Jan. 09, 2020 (I))

The molarity of HNO_3 in a sample which has density 1.4 g/mL and mass percentage of 63% is _____. (Molecular Weight of HNO_3 = 63)

Question

138 g of ethyl alcohol is mixed with 72 g of water. The ratio of mole fraction of ethyl alcohol to water is if molar mass of ethyl alcohol is 46 g and of water is 18 g.

A 3 : 4

B 1 : 2

C 1 : 4

D 1 : 1

QUESTION (JEE Main 2021, 31st Aug 1st Shift)

The molarity of the solution prepared by dissolving 6.3 g of oxalic acid ($H_2C_2O_4.2H_2O$) in 250 mL of water in mol L^{-1} is $x \times 10^{-2}$. The value of x is _____. (Nearest integer) [Atomic mass: H : 1.0, C : 12.0, O : 16.0]

THANK YOU