YAKEEN NEET 2.0

2026

Some Basic Concept of Chemistry

Physical Chemistry | Lecture -10

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Topics to be covered

1. Revision of Last Class
2. EF & MF numericals
3. Quantitative Analysis of Organic Compounds, Concentration Terms
4. [redacted]
5. MPQ (Magarmach Practice Questions) & Home work from Modules

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.

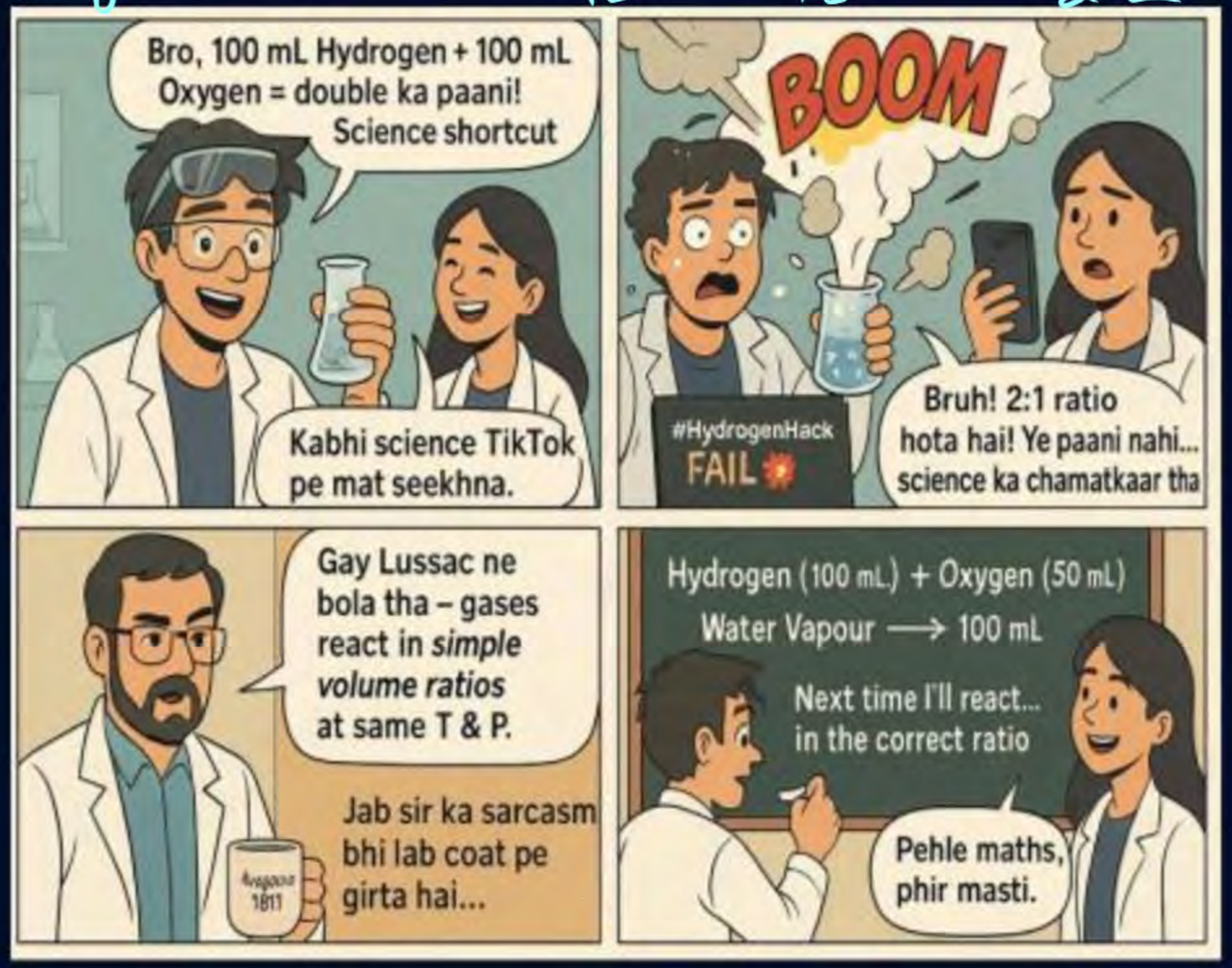
Rules to Attend Class

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

Gay lussac's law ⇒ $1H_2(g) + 1Cl_2(g) \rightarrow 2HCl(g)$
1L 1L 2L



Avogadro's law

$$\frac{V_A}{V_B} = \frac{n_A}{n_B} = \frac{\text{Molecules } A}{B}$$

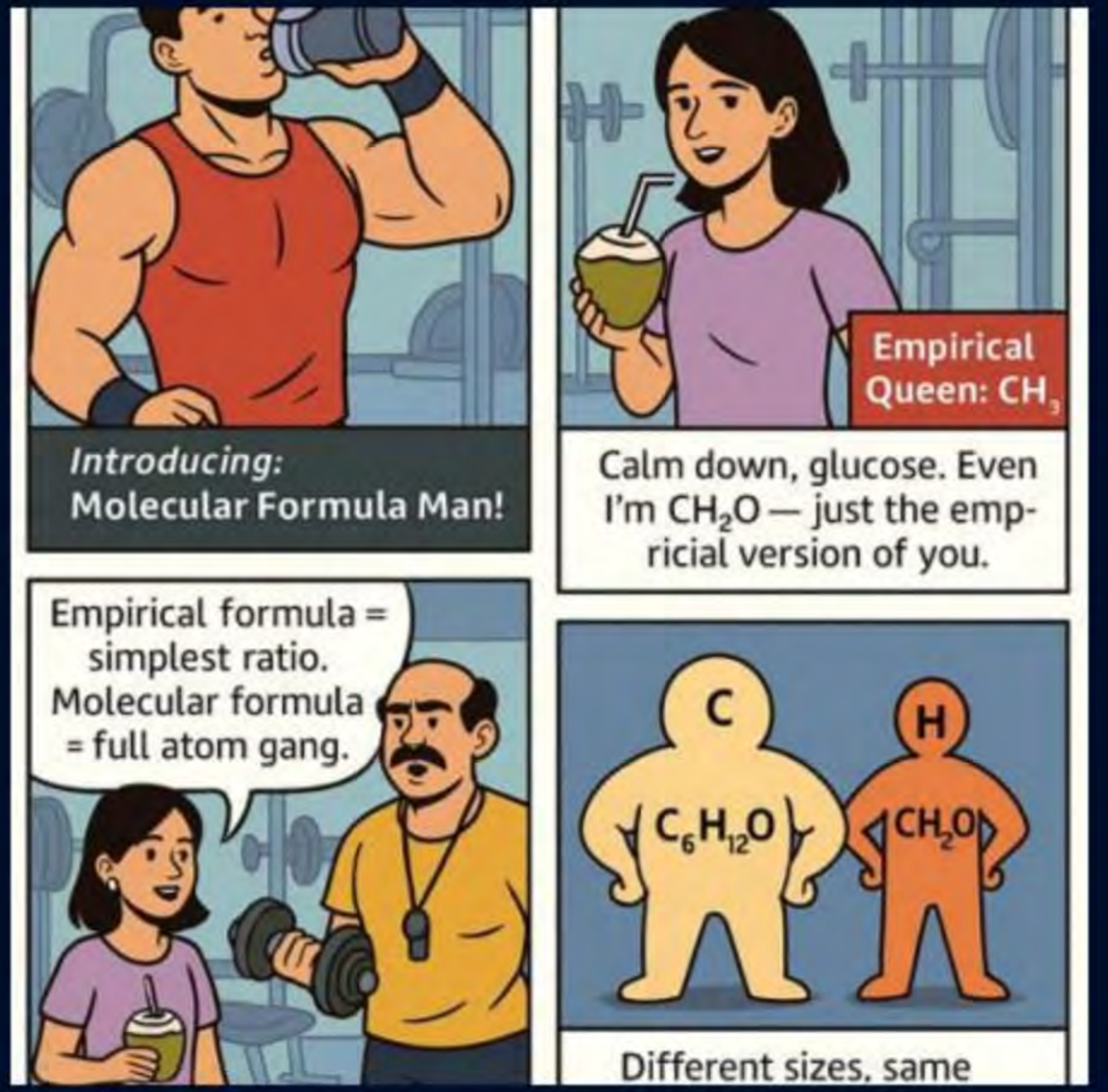
E.F. & M.F.

↓ ↓

Simplest molecule actual molecule

↓ ↓

CH_2O $C_6H_{12}O_6$



Question

The hydrated salt $Na_2CO_3.xH_2O$ undergoes 63% loss in mass on heating and becomes anhydrous. The value of x is:

A. 10

B. 12

C. 8

D. 18

$\frac{1260}{-126}$
1134

$2\times23+1\times12+3\times16+18x$

$Na_2CO_3 \cdot x(H_2O)$ — Hydrated salt

$\xrightarrow{\Delta}$ $Na_2CO_3(s)$ + $x\,H_2O(g)$

$Na_2CO_3(s)$: anhydrous salt.

$\frac{63}{100} \times m$ = mass of x moles H_2O

$\frac{63}{100} \times (106+18x) = x \times 18$

$68.78 + 11.34x = 18x$

$18x - 11.34x = 68.78$

$6.66x = 68.78$

$x = \frac{68.78}{6.66} \approx 10$

Question

A gas is found to contain 2.34 grams of nitrogen and 5.34 grams of oxygen. Simplest formula of the compound is:

A N_2O

B NO

C N_2O_3

D NO_2

$N_{\frac{2.34}{14}}O_{\frac{5.34}{16}}$

$N_{0.17}O_{\frac{0.34}{0.17}}^{2}$

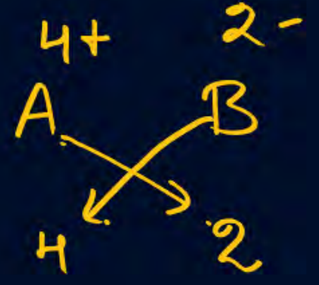
NO_2

Question

valency 4

valency 2.

An element A is tetravalent and another element B is divalent. The formula of the compound formed from these elements will be:



A) A_2B

B) AB

C) AB_2

D) A_2B_3

$A_{\frac{2}{2}}B_{\frac{4}{2}}^{2}$

AB_2

Question Jee mains

The most abundant element by mass in the body of a healthy human adult are oxygen (61.4%); carbon (22.9%), Hydrogen (10.0%); and Nitrogen (2.6%). The weight which a 75 kg person would gain if all ^{1}H atoms are replaced by ^{2}H atoms is

(A) 15 kg

(B) 37.5 kg

(C) 7.5 kg

(D) 10 kg

mass of H $= \frac{10}{100} \times 75 = 7.5$ Kg.

mass dec. $= 75 - 7.5 = 67.5$ Kg.

inc. $= 15$ Kg.

Change in mass
$= -7.5 + 15 = 7.5$ Kg.

Diet.

Wt. loss

$80 \quad -10\,Kg \Rightarrow 70 + 20 = 90\,Kg.$

$+20\,Kg.$

Quantitative Analsis of Organic Compounds

① Org Cmpd →

$\%\ of\ C = \frac{12 \times mass\ of\ CO_2(g)}{44 \times mass\ of\ org\ cmpd} \times 100$

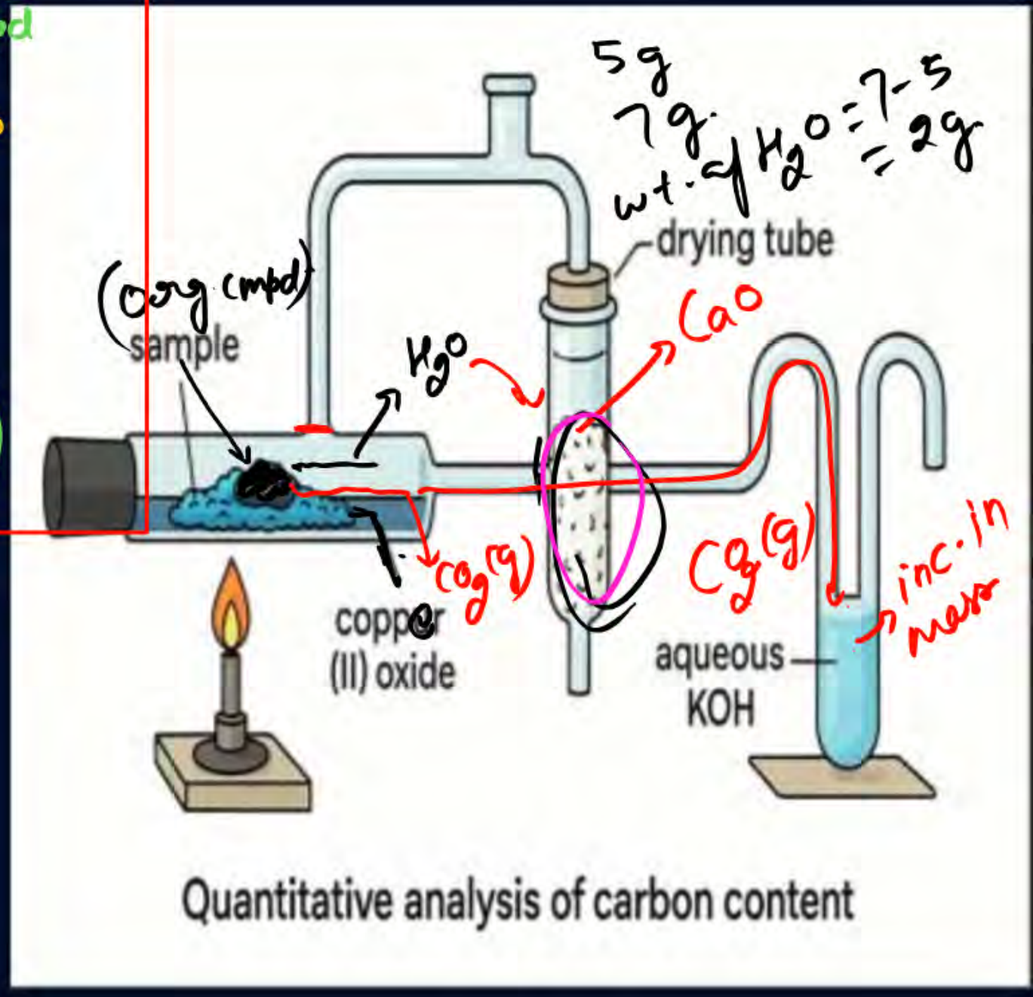
$\%\ of\ H = \frac{2 \times mass\ of\ H_2O \times 100}{18 \times mass\ of\ Org\ cmpd}$

$C_xH_y \rightarrow \%\ of\ C + \%\ of\ H = 100$

$C_xH_yO_z \rightarrow \%\ of\ C + \%\ of\ H + \%\ of\ O_{xz} = 100$

$\%\ of\ O_{xy} = 100 - (\%\ of\ C + \%\ of\ H)$

$C_xH_y(g) + \left(x + \frac{y}{4}\right)O_2(g) \rightarrow xCO_2(g) + \frac{y}{2}H_2O(l)$



Quantitative analysis of carbon content

% age of C in Org. Cmpd $= \frac{\text{mass of C}}{\text{mass of Org. Cmpd}} \times 100$

(given)

44g of CO_2 has C = 12g

1g ——— $= \frac{12}{44}$

(given) yg of ~~mass of~~ $= \frac{12}{44} \times y\,g$ (mass of CO_2)

% of H in Org. Cmpd $= \frac{\text{mass of H}}{\text{Org. Cmpd.}} \times 100$

18g H_2O has mass of H = 2g

1g ——— $= \frac{2}{18}$

2g ——— $= \left(\frac{2}{18} \times 2\right)g$

Question (NCERT: PL-23 | JEE Main April 08, 2025 (II))

On combustion 0.210 g of an organic compound containing C, H and O gave 0.127 g H_2O and 0.307 g CO_2. The percentages of hydrogen and oxygen in the given organic compound respectively are:

(A) 53.41, 39.6

(B) 6.72, 53.41

(C) 7.55, 43.85

(D) 6.72, 39.87

mass of O.C. = 0.21 g

—— H_2O = 0.127 g

—— CO_2 = 0.307 g

$\% \text{ of } C = \frac{12 \times 0.307 \times 100}{44 \times 0.21} = \frac{3070}{77} \approx 40$

$\% \text{ of } H = \frac{2 \times 0.127 \times 100}{18 \times 0.21} \approx \frac{20}{3} \approx 6.72$

$\% \text{ of } O = 100 - 46.72$

$\approx 54\%$

Question (NCERT: PL-23 | NV, JEE Main April 07, 2025 (I))

An organic compound weighing 500 mg, produced 220 mg of CO_2, on complete combustion. The percentage composition of carbon in the compound is _____ %. (nearest integer)

Ans $W_{O.C.} = 500\,mg$

$W_{CO_2} = 220\,mg$

$$\%\,C = \frac{12}{44} \times \frac{220}{500} \times 100 = 12\%$$

Question (NCERT: PL-19 | NV, JEE Main April 02, 2025 (I))

$(C_xH_yO_z)$

On complete combustion 1.0 g of an organic compound (X) gave 1.46 g of CO_2 and 0.567 g of H_2O. The empirical formula mass of compound (X) is _____ g.
(Given molar mass in g mol^{-1} C : 12, H : 1, O : 16)

A) 30

B) 45

C) 60

D) 15

$\%\ of\ C = \frac{12}{44} \times \frac{1.46}{1} \times 100$

$= \frac{438}{11} \approx 39.8$

$\%\ of\ H = \frac{2}{18} \times 0.567 \times 100 = 6.3\%$

$\%\ of\ O = 100 - (39.8 + 6.3)$

$\%\ of\ O_x = 100 - 46.1 = 53.9\%$

$C_{\frac{39.8}{12}}\ H_{\frac{6.3}{1}}\ O_{\frac{53.9}{16}}$

$C_{\frac{3.32}{3.32}}\ H_{\frac{6.3}{3.32}}\ O_{\frac{3.32}{3.32}}$

CH_2O mass $= 12 + 2 + 16 = 30$

Solutions

Concentration terms.

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 tin

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

Solutions

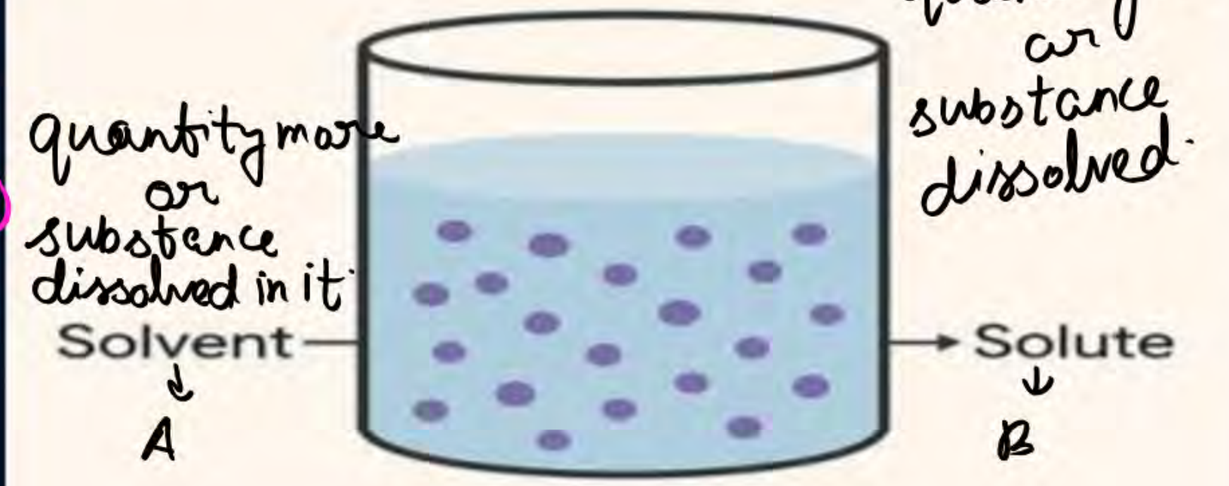
mix. of 2 or more substance.

n_A = moles solvent = $\frac{W_A \text{ (mass of solvent)}}{M_A \text{ (molar mass solvent)}}$

n_B = moles solute = $\frac{W_B \text{ (mass of solute)}}{M_B \text{ (Molar mass solute)}}$

SOLUTION

A solution is a homogeneous mixture of two or more substances.



Mass percentage or Weight Percentage (W/W)

mass of solute in 100 g of solution.

	mass solution	mass solute
30% (w/w) HNO_3 soln (solute)	100 g	30 g
25% (w/w) HCl soln	100 g	25 g

$$\text{Mass \% of solute} = \frac{W_B}{\text{mass soln}} \times 100$$

$$\text{Solvent} = \frac{W_A}{\text{mass soln}} \times 100$$

Question

$^{40}Ca, {}^{12}C, {}^{16}O, {}^{31}P$

What percentage of oxygen is present in the compound $CaCO_3.3Ca_3(PO_4)_2$?

$$\%\ of\ ox. = \frac{3\times16 + 24\times16}{1\times40 + 1\times12 + 3\times16 + 24\times16 + 9\times40 + 6\times31}\ Ca_3(PO_4)_2 \times 100$$

$$= \frac{432}{1030} \times 100$$

$$= 41.94\%$$

$$\frac{432}{1000} \times 100$$

	1
	40
2	12
	432
	360
	186
	1630

A. 23.3%

B. 45.36%

C. 41.94%

D. 17.08%

Question

A compound used in making nylon, is 43.8% oxygen. There are four oxygen atoms per molecule. What is the molecular weight of compound?

(A) ✗ 36

(B) 116

(C) ✗ 292

(D) 146

x = molecular weight

4 atoms oxygen.

$\frac{43.8}{100} \times x$ = mass of oxygen.

$\frac{43.8}{100} \times x = 4 \times 16$

$x = \frac{6400}{43.8} = 146$

Volume percentage (V/V)

Volume of solute in 100ml solution.

	Volume soln	Volume solute
29% HCl (V/V)	100 ml	29 ml

$$\text{Volume \% age of solute} = \frac{\text{Volume of solute}}{\text{Volume of solution}} \times 100$$

$$\text{Solvent} = \frac{\text{Volume of solvent}}{\text{Vol. solution}} \times 100$$

Q find Volume %age if 10ml alcohol mixed with 40 ml water?

A Vol %age of solute $= \frac{10}{50} \times \cancel{100}^{20} = 20\%$

Strength percentage (W/V)

or % age by strength

(g)
mass of solute in 100 ml of solution.

	V of soln	mass solute
35% by strength	100 ml	35 g
49% by strength	100 ml	49 g

$$\%\text{ by strength} = \frac{\text{mass of solute (g)}}{\text{Volume of solution (ml)}} \times 100$$

Mass → Kg Volume → m^3

—— g ——→ ml (cm^3)

Q If 25 g solute present in 200 ml sol^n. find %age by strength

Ans %age by strength = $\frac{25}{200} \times 100 = 12.5\%$

till Saturday
↓
Complete Chapter overview
↓
MPQ → Saturday → Complete Chapter

Magarmach Practice Questions (MPQ)

Question

A 6.85 g sample of the hydrate $Sr(OH)_2.xH_2O$ is dried in an oven to give 3.13 g of anhydrous $Sr(OH)_2$. What is the value of x? (Atomic weights: Sr = 87.60, O = 16.0, H = 1.0)

A 8

B 12

C 10

D 6

Question (NCERT: PL-19 | NV, JEE Main April 13, 2023 (I))

An organic compound gives 0.220 g of CO_2 and 0.126 g of H_2O on complete combustion If the % of carbon is 24 then the % hydrogen is _____ $\times 10^{-1}$. (Nearest integer)

Question (NCERT: PL-19 | NV, JEE Main June 28, 2022 (II), Same NV July 28, 2022 (I))

The complete combustion of 0.492 g of an organic compound containing 'C', 'H' and 'O' gives 0.793 g of CO_2 and 0.442 g of H_2O. The percentage of oxygen composition in the organic compound is _____. (nearest integer)

Question (NCERT: PL-19 | NV, JEE Main June 27, 2022 (II))

116 g of a substance upon dissociation reaction, yields 7.5 g of hydrogen, 60g of oxygen and 48.5 g of carbon. Givne that the atomic masses of H, O and C are 1, 16 and 12 respectively. The data agrees with how many formulae of the following?

(A) CH_3COOH

(B) $HCHO$

(C) CH_3OOCH_3

(D) CH_3CHO

Question (NCERT: PL-19 | NV, JEE Main Jan. 24, 2025 (II))

The hydrocarbon (X) with molar mass 80 g mol^{-1} and 90% carbon has _____ degree of unsaturation.

Question (NCERT: PL-18, 19 | NV, JEE Main June 26, 2022 (I))

On complete combustion 0.30 g of an organic compound gave 0.20 g of carbon dioxide and 0.10 g of water. The percentage of carbon in the given organic compound is _____ (Nearest Integer)

Question (NCERT: PL-19 | JEE Main Feb. 25, 2021 (I))

Complete combustion of 1.80 g of an oxygen containing compound ($C_xH_yO_z$) gave 2.64 g of CO_2 and 1.08 g of H_2O. The percentage of oxygen in the organic compound is:

(A) 50.33

(B) 53.33

(C) 51.63

(D) 63.53

Question (JEE Main 2018)

The ratio of mass percent of C and H of an organic compound ($C_XH_YO_Z$) is 6 : 1. If one molecule of the above compound ($C_XH_YO_Z$) contains half as much oxygen as required to burn one molecule of compound C_XH_Y completely to CO_2 and H_2O. The empirical formula of compound $C_XH_YO_Z$ is :

(A) $C_3H_6O_3$

(B) C_2H_4O

(C) $C_3H_4O_2$

(D) $C_2H_4O_3$

Question (NCERT: PL-20 | NV, JEE Main April 07, 2025 (II))

Butane reacts with oxygen to produce carbon dioxide and water following the equation given below

$$C_4H_{10}(g) + \frac{13}{2}O_2(g) \rightarrow 4CO_2(g) + 5H_2O(l)$$

If 174.0 kg of butane is mixed with 320.0 kg of O_2, the volume of water formed in litres is _____. (Nearest integer) [Given : (a) Molar mass of C, H, O are 12, 1, 16 g mol^{-1} respectively, (b) Density of water = 1 g mL^{-1}]

Question (NV, JEE Main Feb. 01, 2024 (II))

10 mL of gaseous hydrocarbon on combustion gives 40 mL of $CO_2(g)$ and 50 mL of water vapour. Total number of carbon and hydrogen atoms in the hydrocarbon is _____.

THANK YOU