YAKEEN NEET 2.0

2026

Some Basic Concept of Chemistry

Physical Chemistry | Lecture -06

By- Amit Mahajan Sir

Topics to be covered

1. Revision of Last Class
2. Ideal gas equation
3. Stoichiometric Calculations, Percentage yield
4.  Trick for fast calculation
5. MPQ (Magarmach Practice Questions) & Home work from Modules

Rules to Attend Class

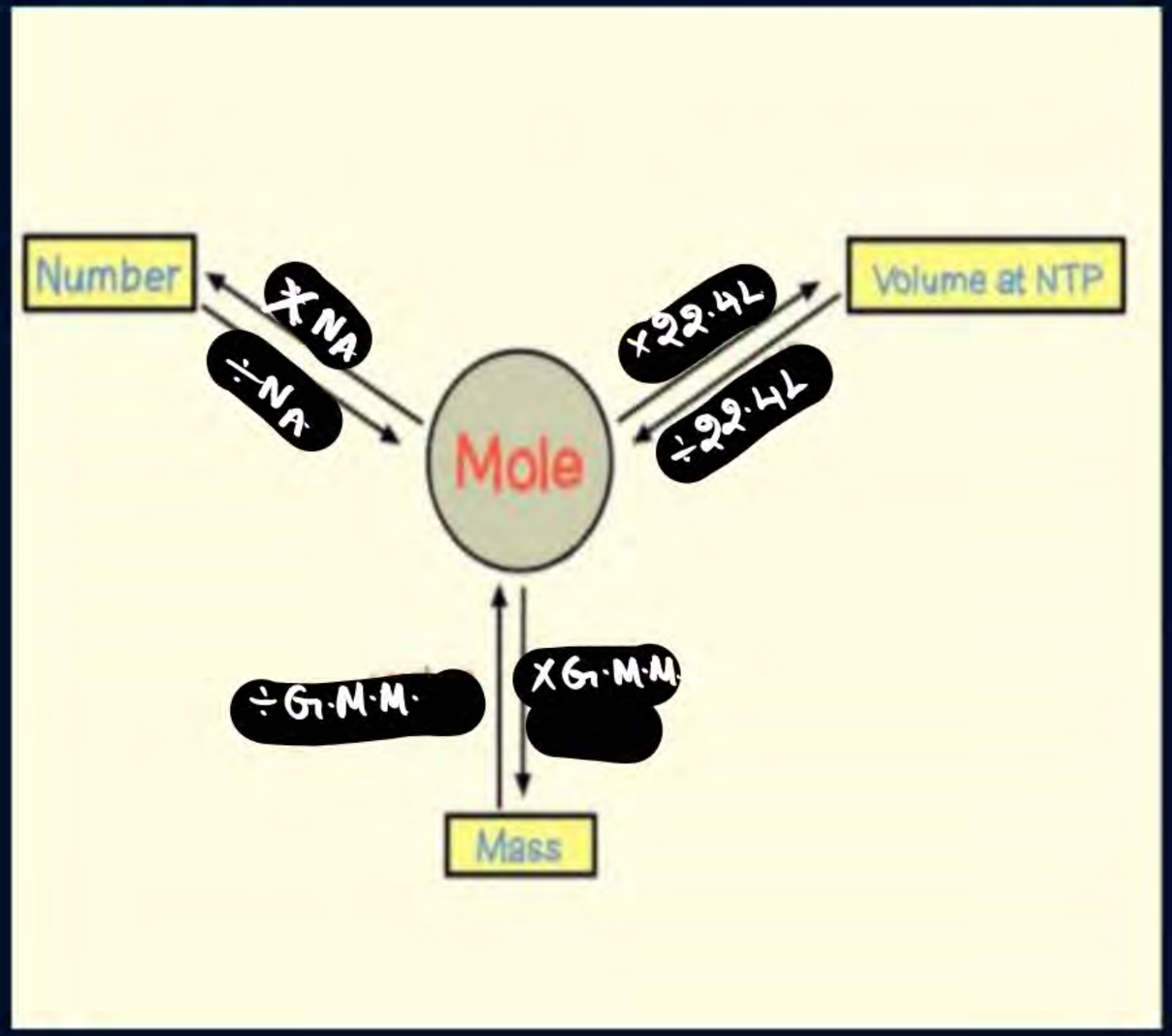
1. Always sit in a peaceful environment with headphone and be ready with your copy and pen.
2. Never ever attend a class from in between or don't join a live class in the middle of the chapter.
3. Make sure to revise the last class before attending the next class & always complete your home work.
4. 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



gram atoms

$$\text{No. of g-atoms} = \frac{\text{mass}}{\text{G.A.M.}}$$

$$\text{g-molecules (moles)} = \frac{\text{mass}}{\text{G.M.M}}$$

$$\text{g-ions} = \frac{\text{mass}}{\text{G.F.M.}}$$

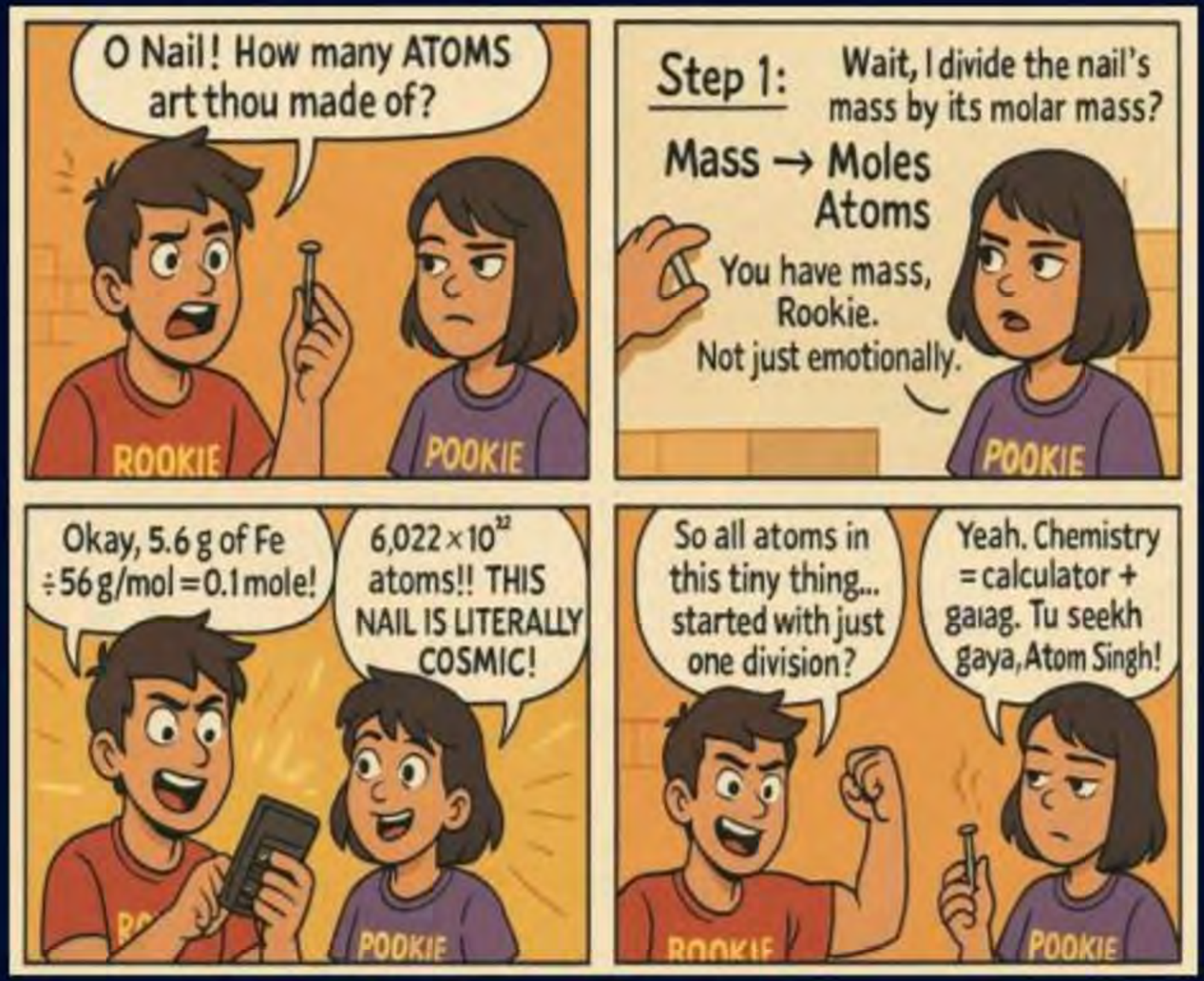
Find no of atoms & subatomic particles if anything is given

atoms = $n \times N_A \times$ atomicity

$e^- = n \times N_A \times$ no. of e^- in 1 particle

$p =$ ~~~~ p ——

$n =$ ~~~~ n ——



Question

What is the mass of a water molecule in gram? How many molecules are present in one drop of pure water which weighs 0.05 g? If the same drop of water evaporates in one hour, calculate the number of molecules leaving the liquid surface per second.

Ans $n = \frac{1}{N_A}$

Mass $= n \times$ Gr. M. M.

$= \frac{1}{N_A} \times 18$ g

1 drop $= 0.05$ g ✓

$n = \frac{0.05}{18}$

molecules $= \frac{0.05 \times N_A}{18}$

$H_2O(l) \rightarrow H_2O(g)$

$t = 1$ hr. $= 1 \times 60 \times 60$ sec.

$= 3600$ sec.

3600 sec. $\rightarrow \frac{0.05}{18} \times N_A$

1 sec. $\rightarrow \frac{0.05 \times N_A}{18 \times 3600}$

Relation between P, V, n, & T of Ideal Gas

(n: moles; P: Pressure; V: Volume; T: Temperature)

#MIT

Ideal Gas

$$PV = nRT \quad | \quad d = \frac{PM}{RT}$$

R = Universal gas Constt.

$R = 0.082\ L\ atm\ K^{-1}\ mol^{-1}$

$\approx \frac{1}{12}\ L\ atm\ K^{-1}\ mol^{-1}$

$= 0.083\ L\ bar\ K^{-1}\ mol^{-1}$

$= 8.314\ J\ K^{-1}\ mol^{-1}$

$\approx \frac{25}{3}\ J\ K^{-1}\ mol^{-1}$

$\approx 2\ Cal\ K^{-1}\ mol^{-1}$

$$n = \frac{mass\ (w)}{G.M.M.\ (M)}$$

$$PV = \frac{w}{M}RT$$

$$PM = \left(\frac{w}{V}\right)RT$$

$$PM = dRT$$

$$d = \frac{PM}{RT}$$

d(density) $= \frac{w}{V}$

Question

Find no. of moles of 44.8 L at T = 546 K & P = 2 atm of Ideal gas?

Ans

$n = ?$

$V = 44.8\ L$

$T = 546\ K$

$P = 2\ atm$

$R \simeq \frac{1}{12}\ L\ atm\ K^{-1}\ mol^{-1}$

$n = \frac{V}{22.4\ L}$

$$PV = nRT$$

$$2 \times 44.8 = n \times \frac{1}{12} \times 546$$

$$n = \frac{2 \times 44.8 \times 12}{546}$$

$$\frac{546}{273}$$

Question

^{12}C, ^{16}O

Find density of $CO_2(g)$ at 4 atm & 300 K.

Ans $d = ?$

$P = 4\ atm$

$T = 300\ K$

$M_{CO_2} = 1 \times 12 + 2 \times 16 = 44$

$$d = \frac{PM}{RT}$$

MIT

Same unit things can be added or subtracted.

x molecules $-$ y moles $=$

$\left(\frac{x}{N_A} - y\right)$

Question (NCERT: PL-18 | JEE Main Jan. 23, 2025 (I))

2.8×10^{-3} mol of CO_2 is left after removing 10^{21} molecules from its 'x' mg sample. The mass of CO_2 taken initially is Given : $N_A = 6.02 \times 10^{23}$ mol^{-1}.

$1\,g = 1000\,mg$

$\frac{1}{1000}\,g = 1\,mg$

$M_{CO_2} = 44\,g/mol$

x mg — 10^{21} molecules $= 2.8 \times 10^{-3}$ mol

$$\frac{x}{1000 \times 44} - \frac{10^{21}}{6.02 \times \frac{10^{23}}{100}} = 2.8 \times 10^{-3}$$

$$\frac{x}{44 \times 10^3} - \frac{1}{602} = 28 \times 10^{-4}$$

$$\frac{x}{44 \times 10^3} = 28 \times 10^{-4} + \frac{1}{602} = 0.0028 + 0.0016 = 0.0044$$

(A) 196.2 mg

(B) 98.3 mg

(C) 150.4 mg

(D) 48.2 mg

$$x = \frac{0.0044}{10000} \times 44 \times 10^{3}$$

$$x = \frac{1936}{10} = 193.6\ g$$

$$\begin{array}{r} 443 \\ \times\ 44 \\ \hline 1936 \end{array}$$

Stoichiometric Calculations

$x\,A(g) + y\,B(g) \rightarrow z\,C(s) + \omega\,D(g)$

↓

Stoichiometric coefficients (S.C.)

S.C. Can be.

(a) moles.

x moles A react y moles B to give z moles C & ω moles D

(b) molecules.

x molecules —— y molecules B —— z molecules C & ω —

© Volume for gases only at (same T & P)

x L of A react with y L of B to give w L of D

MIT

other reactant excess

① 1 given & 1 find
(g) (f)

② given → moles Calculate

③ $\frac{(S.C)_f}{(S.C)_g} = \frac{n_f}{n_g}$

④ n_f

mass = $n_f \times$ Gr. M. M.

molecules = $n_f \times N_A$

Vol. gas at NTP = $n_f \times 22.4$ L

Question

(a) 1 mol SO_2 reacts with excess of H_2S, then moles of S formed is:

$$1SO_2 + 2H_2S \longrightarrow 2H_2O + 3S$$

given — excess — find

$n_g = 1$

$$\frac{3}{1} = \frac{n_f}{1}$$

$n_f = 3 = n_{SO_2}$

(b) 5 moles of SO_2, find moles of S formed in above reaction.

$n_g = 5$

$$\frac{3}{1} = \frac{n_f}{5} \Rightarrow n_f = 15 = n_{SO_2}$$

Question

Maximum moles of $Ba_3(PO_4)_2$ that can be obtained in the following reaction on taking 4 mole of Na_3PO_4 and excess of $BaCl_2$ is _____.

$$2Na_3PO_4 + 3BaCl_2 \longrightarrow Ba_3(PO_4)_2 + 6NaCl$$

g (excess) f

A 1

B 2

C 3

D 6

$n_g = 4$

$\frac{1}{2} = \frac{n_f}{4}$

$n_f = \frac{4}{2} = 2 = n_{Ba_3(PO_4)_2}$

Question

$^{32}_{16}S$ $^{16}_{8}O$

How many grams of SO_3 are produced from 1 mole of S_8?

G.M.M.(SO_3) = 1×32 + 3×16 = 80 g

$1\,S_8 + 12\,O_2 \longrightarrow 8\,SO_3$

g f

$n_g = 1$

$\frac{8}{1} = \frac{n_f}{1}$

$n_f = 8 = n_{SO_3}$

mass SO_3 = n_{SO_3} × G.M.M.SO_3

= 8 × 80 = 640 g

A 1280.0

B 640.0

C 960.0

D 320.0

QUESTION – (Kerala PMT 2014)

$^{40}_{20}Ca$ $^{12}_{6}C$ $^{16}_{8}O$

NTP

What is the volume of CO_2 liberated (in litres) at 1 atmosphere and 0°C when 10 g of 100% pure calcium carbonate is treated with excess dilute sulphuric acid?

(Atomic mass: Ca : 40, C : 12, O : 16)

$V_{CO_2} = ?$

$$1\,CaCO_3 + 1\,H_2SO_4 \rightarrow 1\,CaSO_4 + 1\,H_2O + 1\,CO_2$$

(g) (f)

A. 0.224

B. 2.24 ✓

C. 22.4

D. 224

E. 11.2

① $n_{CaCO_3} = \frac{10}{G.M.M.} = \frac{10}{100} = 0.1$

② $\frac{1}{1} = \frac{n_f}{0.1}$

$n_f = 0.1$

③ Vol CO_2 at NTP $= n_f \times 22.4\,L$

$= 0.1 \times 22.4\,L$

$= 2.24\,L$

Q NEET-2019

no. of moles of H_2 required to produce 20 moles of NH_3 through Haber's process

(a) 40

(b) 10

(c) 20

(d) 30 ✓

$$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$$

(1) $n_g = 20$

(2) $\frac{3}{2} = \frac{n_f}{20}$

$$30 = \frac{3 \times 20}{2} = n_f$$

2005

Q. Mass of C (anodes) Consumed in production of 270 Kg of Aluminium metal from bauxite by Hall process is :-

$$2Al_2O_3 + \underset{f}{3C} \longrightarrow \underset{g}{4Al} + 3CO_2$$

$^{27}_{13}Al$, $^{12}_{6}C$, $^{16}_{8}O$

① $n_g = \frac{270\,Kg}{G.A.M.}$

$= \frac{10000}{\frac{270000}{27}}$

$= 10000$

$\frac{3}{4} = \frac{n_f}{10000}$

$n_f = \frac{30000}{4} = 7500 = n_C$

mass $= 7500 \times 12$

$= 90000\,g$

$= 90\,kg$

Balancing of Combustion of Organic Compounds

① $\underline{1}C_xH_y(g) + \left(x+\frac{y}{4}\right)O_2(g) \rightarrow x\,CO_2(g) + \frac{y}{2}H_2O(l)$ ($1H_2O$ ✓)

Volume Contraction for 1 L of $C_xH_y(g)$ = $\sum$ Gaseous vol. reactant − $\sum$ gaseous vol. product

$= \left(1 + x + \frac{y}{4}\right) - \left(x + 0\right)$

$= \left(1 + \frac{y}{4}\right)$ L

Q $1C_2H_6(g) + \frac{7}{2}O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l)$

$x = 2$, $y = 6$

$2 + \frac{6}{4_2} = 2 + \frac{3}{2} = \frac{4+3}{2} = \frac{7}{2}$

Vol. Contraction for 1 L of C_2H_6

$= \left(1 + \frac{7}{2}\right) - (2+0) = \frac{9}{2} - 2 = 2.5$ L

$$1\,C_3H_8(g) + 5\,O_2(g) \longrightarrow 3\,CO_2(g) + 4\,H_2O(l)$$

$x = 3$ ✓

$y = 8$

$3 + \frac{8}{4} = 5$

Volume Contraction from 1 L of C_3H_8 = $(1 + 5) - (3 + 0)$

$= 6 - 3 = 3\,L$

Question

g excess f

$$1\,C_3H_8(g) + 5O_2(g) \longrightarrow 3CO_2(g) + 4H_2O(l)$$

(C_3H_8)

Find the volume of CO_2 formed if 5L of propane undergoes combustion with excess of O_2? & also find Vol. Contraction for 5L of C_3H_8?

Ans. $V_{CO_2} = 15\,L$

$n_g = \frac{5}{22.4}$

$\frac{3}{1} = \frac{n_f}{\frac{5}{22.4}} \Rightarrow n_f = \frac{15}{22.4}$

$V_{CO_2} = \frac{15}{22.4} \times 22.4 = 15\,L$

Vol. contraction for 1L of $C_3H_8 = (1+5) - 3$

5L → $= 3L \times 5$

$= 15\,L$

Home work from modules

Prarambh → Q 45, 46, 47, 49, 51, 54, 59

Equation

$Mg(s) + 2HCl \rightarrow MgCl_2(s) + H_2(g)$

Tricks for fast Calculations

find sq. root of perfect square.

no	square
1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64
9	81
10	100

no	square
10	100
20	400
30	900
40	1600
50	2500
60	3600
70	4900
80	6400
90	8100
100	10000

Magarmach Practice Questions (MPQ)

Revise all 5 classes of week
then attempt
Today's MPQ

Tum Kitne Cute lag rahe hona
(bas daant andar karlo)

Question (NEET 2014)

Equal masses of H_2O_2 and methane have been taken in a container of volume V at temperature 27°C in identical conditions. The ratio of the volumes of gases $H_2 : O_2$: methane would be

A) 8 : 16 : 1

B) 16 : 8 : 1

C) 16 : 1 : 2

D) 8 : 1 : 2

Question (NEET 1990)

The molecular weight of O_2 and SO_2 are 32 and 64 respectively. At 15°C and 150 mm Hg pressure, one litre of O_2 contains 'N' molecules. The number of molecules in two litres of SO_2 under the same conditions of temperature and pressure will be

(A) N/2

(B) N

(C) 2 N

(D) 4 N

Question (NEET 2024)

The highest number of helium atoms is in

(A) 4 mol of helium

(B) 4 u of helium

(C) 4 g of helium

(D) 2.271098 L of helium at STP

Question (NEET 2020)

Which one of the followings has maximum number of atoms?

(A) 1 g of $Ag_{(s)}$ [Atomic mass of Ag = 108]

(B) 1 g of $Mg_{(s)}$ [Atomic mass of Mg = 24]

(C) 1 g of $O_{2(g)}$ [Atomic mass of O = 16]

(D) 1 g of $Li_{(s)}$ [Atomic mass of Li = 7]

Question (NEET 2018)

In which case is number of molecules of water maximum?

(A) 18 mL of water

(B) 0.18 g of water

(C) 0.00224 L of water vapours at 1 atm and 273 K

(D) 10^{-3} mol of water

Question (NEET 2016-II)

Suppose the elements X and Y combine to form two compounds XY_2 and X_3Y_2. When 0.1 mole of XY_2 weighs 10 g and 0.05 mole of X_3Y_2 weighs 9 g, the atomic weights of X and Y are

(A) 40, 30

(B) 60, 40

(C) 20, 30

(D) 30, 20

Question (NEET 2015)

The number of water molecules is maximum in

(A) 1.8 gram of water

(B) 18 gram of water

(C) 18 moles of water

(D) 18 molecules of water.

Question (NEET 2015-Cancelled)

A mixture of gases contains H_2 and O_2 gases in the ratio of 1: 4 (w / w) What is the molar ratio of the two gases in the mixture?

(A) 16:1

(B) 2:1

(C) 1:4

(D) 4:1

Question (NEET 2011)

Which has the maximum number of molecules among the following?

(A) 44 g CO_2

(B) 48 g O_3

(C) 8 g H_2

(D) 64 g SO_2

Question (NEET 2010)

The number of atoms in 0.1 mol of a triatomic gas is ($N_A = 6.02 \times 10^{23}$ mol^{-1})

(A) 6.026×10^{22}

(B) 1.806×10^{23}

(C) 3.6×10^{23}

(D) 1.8×10^{22}

Question (NEET 2004)

The maximum number of molecules is present in

(A) 15 L of H_2 gas at STP

(B) 5 L of N_2 gas at STP

(C) 0.5 g of H_2 gas

(D) 10 g of O_2 gas

Question (NEET 2002)

Which has maximum molecules?

(A) 7 g N_2

(B) 2 g H_2

(C) 16 g NO_2

(D) 16 g O_2

Question (NEET 2001)

Specific volume of cylindrical virus particle is 6.02×10^{-2} cc / g whose radius and length are 7 Å and 10 Å respectively. If $N_A = 6.02 \times 10^{23}$ find molecular weight of virus.

(A) 15.4 kg/mol

(B) 1.54×10^4 kg / mol

(C) 3.08×10^4 kg / mol

(D) 3.08×10^3 kg / mol

Question (NEET 1999)

The number of atoms in 4.25 g of NH_3 is approximately

(A) 4×10^{23}

(B) 2×10^{23}

(C) 1×10^{23}

(D) 6×10^{23}

Question (NEET 1995)

The number of moles of oxygen in one litre of air containing 21% oxygen by volume, under standard conditions, is

(A) 0.0093 mol

(B) 2.10 mol

(C) 0.186 mol

(D) 0.21 mol

Question (NEET 1994)

The total number of valence electrons in 4.2 g of N_3^- ion is (N_A is the Avogadro's number)

(A) 2.1 N_A

(B) 4.2 N_A

(C) 1.6 N_A

(D) 3.2 N_A

Question (NEET 1990)

The number of gram molecules of oxygen in 6.02×10^{24} CO molecules is

(A) 10 g molecules

(B) 5 g molecules

(C) 1 g molecule

(D) 0.5 g molecules

Question (NEET 1989)

The number of oxygen atoms in 4.4 g of CO_2 is

A 1.2×10^{23}

B 6×10^{22}

C 6×10^{23}

D 12×10^{23}

23479

THANK YOU