

# YAKEEN NEET 2.0

Physical Chemistry

2026

Some Basic Concept of Chemistry

Complete PDF of all Questions

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**According to Charaka Samhita, extreme reduction in metal size was part of:**

**A** Atomic fusion

**B** Ayurvedic cooling

**C** Nanotechnology

**D** Alkaline testing

**Which ancient civilization is associated with early chemical processes like baking bricks and pottery?**

**A** Egyptian

**B** Roman

**C** Harappan

**D** Chinese

**The preparation of soaps in 18th century India included:**

**A**  $\text{CaCO}_3$  only

**B** Ash and acid

**C** Oil of Eranda and seeds of Mahua

**D** Lemon and soda

**Assertion (A):** Chemistry has contributed significantly to cancer therapy.

**Reason (R):** Cisplatin and Taxol are drugs used in the treatment of cancer..

- A. Both A and R are true, and R is the correct explanation of A
- B. Both A and R are true, but R is not the correct explanation of A
- C. A is true, but R is false
- D. A is false, but R is true

## Question

### Column A

- A. Cisplatin
- B. AZT (Azidothymidine)
- C. Safer alternatives to CFCs
- D. Conducting polymers

### Column B

- i. Used in AIDS therapy
- ii. Used in cancer therapy
- iii. Environmental protection
- iv. Industrial application in electronics

**Which of the following is a chemical fertilizer?**

**A** Urea

**B** Sodium Nitrate

**C** Ammonium sulphate

**D** All of these

**Which is not a type of matter?**

**A** Dil (heart)

**B** Dimag (Brain)

**C** Haddi (Bone)

**D** Mann

**Statement-I: Matter can neither be created nor be destroyed.**

**Statement-II: In all physical and chemical changes, the total mass of the reactions is never equal to the total mass of the products..**

- A** Both statement-I and statement-II are correct
- B** Both statement-I and statement-II are incorrect
- C** Statement-I is correct and statement-II is incorrect
- D** Statement-I is incorrect and statement-II is correct

## Question

**The ability of gases to occupy the entire volume of the container is due to:**

- A** Strong intermolecular forces
- B** High density
- C** Negligible intermolecular forces
- D** Definite shape

**Which of the following is the correct order of particle movement from least to greatest?**

- A** Solid < Liquid < Gas
- B** Gas < Liquid < Solid
- C** Liquid < Solid < Gas
- D** Solid < Gas < Liquid

**The decline of Iatrochemistry in India began with:**

**A**

Introduction of European alchemy

**B**

Rise of Buddhist traditions

**C**

Adoption of modern Western medicine

**D**

British banning Ayurveda

AZT is used for treatment of

- A** Cancer
- B** AIDS
- C** Headache
- D** None of these

**Which is a type of matter?**

- A** Pen
- B** Paper
- C** Ink
- D** All of these

**Which of the following is not a characteristic of solids?**

- A** Definite shape
- B** Definite volume
- C** High compressibility
- D** Strong intermolecular forces

### Which statement is correct about gases?

- A** Gases have fixed shape but not fixed volume
- B** Gases are incompressible
- C** Gases have negligible intermolecular forces
- D** Gases have highest density among the three states

## Question

**Which state of matter exhibits both viscosity and fluidity?**

**A** Solid

**B** Liquid

**C** Gas

**D** All of these

**Statement 1 : On heating, a solid usually changes to a liquid and the liquid on further heating changes to the gaseous state.**

**Statement 2 : Arrangement of constituent particles is different in solid, liquid and gaseous state.**

- A** Both statement-I and statement-II are correct
- B** Both statement-I and statement-II are incorrect
- C** Statement-I is correct and statement-II is incorrect
- D** Statement-I is incorrect and statement-II is correct

**Which of the following is not a correct match?**

- A** Solid - Least compressible
- B** Liquid - Definite shape
- C** Gas - No definite volume
- D** Plasma - Ionized gas

### Which property is not exhibited by liquids?

- A Surface tension
- B Definite shape
- C Viscosity
- D Ability to flow

**Question**

**Which among the following states of matter has the highest kinetic energy of particles at room temperature ?**

**A** Solid

**B** Liquid

**C** Gas

**D** Plasma

## Question

**Which of the following pairs are both elements?**

- A** CO and NO
- B** C and Cu
- C** NaCl and K
- D** H<sub>2</sub>O and O<sub>2</sub>

## Question

**Which of the following is a pure substance?**

**A** Brass

**B** Milk

**C** Distilled water

**D** Air

## Question

**Which of the following is a compound?**

- A** Hydrogen gas
- B** Oxygen gas
- C** Carbon dioxide
- D** Nitrogen gas

### Which of the following statements is true for compounds?

A

They can be separated by physical methods

B

They are formed by physical mixing of elements

C

They have variable composition

D

They are composed of elements in fixed ratio

**Which of the following is a correct match?**

**A** Air - Element

**B** Salt solution - Compound

**C** Graphite - Element

**D** Ammonia - Mixture

## Question

Which of the following may contain one proton and one neutron?



## Question



**Find no. of protons, Electron in neutrons in 1 molecule of  $\text{NH}_3$   $^{14}_7\text{N}$ ,  $^1_1\text{H}$**

Find no. of protons , electrons and neutrons in molecule of



A CO

B CH<sub>4</sub>

C CaCO<sub>3</sub>

D SO<sub>2</sub>

**Co stands for \_\_\_\_ while CO stands for \_\_\_\_.**

- A** The atoms of the element cobalt; the atoms of the compound carbon monoxide
- B** The atoms of the element carbon monoxide
- C** The atom of the element cobalt; the molecules of the compound carbon monoxide
- D** The molecules and atoms of element carbon

**Find the number of Protons, Electrons and Neutrons in  $\text{NH}_4^+$ ?**

Number of electrons in  $^{40}_{19}K^+$

- A 31
- B 40
- C 18
- D 17

## Question

An atom has a net charge of -1. It has 18 electrons and 20 neutrons. Its isotopic symbol is:

- A  ${}_{18}^{37}Cl^-$
- B  ${}_{17}^{37}Cl^-$
- C  ${}_{16}^{37}Cl^-$
- D  ${}_{17}^{38}Cl^-$

**QUESTION (AIIMS 1994)**

**According to Dalton's atomic theory, the smallest particle in which matter can exist, is called.**

- A** An electron
- B** An atom
- C** A molecular
- D** An ion

**Who defined chemistry as “the science of molecules and their transformations”?**

**A** John Dalton

**B** Acharya Kanda

**C** Roald Hoffmann

**D** Nagarjuna

## Question

An example of a homogeneous mixture is:

A Smoke

B Oil and water

C Sugar solution

D Soil

## Question

**Which of the following mixtures is heterogeneous?**

**A** Vinegar

**B** Brass

**C** Blood

**D** Alcohol and water

**Assertion:** Air is always a homogeneous mixture.

**Reason:** Air is a mixture of gases like  $N_2$ ,  $O_2$  etc.

- A** Both A and R are correct and R is the correct explanation of A.
- B** Both A and R are correct and R is not the correct explanation of A.
- C** A is correct but R is incorrect
- D** A is incorrect but R is correct

### Which property best distinguishes a compound from a mixture?

- A Uniform appearance
- B Separation by physical means
- C Fixed ratio of components
- D Two or more substances present

### Which of the following statements about elements is incorrect?

- A All elements are made up of atoms
- B Elements can be broken down into simpler substances by chemical means
- C Elements may exist as atoms or molecules
- D Each element is represented by a unique symbol

**Which of the following statements about a compound is incorrect?**

**(NCERT Exemplar)**

**A**

**A molecule of a compound has atoms of different elements**

**B**

**A compound cannot be separated into its constituent elements by physical methods of separation**

**C**

**A compound retains the physical properties of its constituent elements**

**D**

**The ratio of atoms of different elements in a compound is fixed**

**Assertion:** The number of elements is limited but the number of compounds is unlimited.

**Reason:** Two or more elements combine to form a compound.

- A** Both A and R are correct and R is the correct explanation of A.
- B** Both A and R are correct and R is not the correct explanation of A.
- C** A is correct but R is incorrect
- D** A is incorrect but R is correct

**According to ancient Indian texts, what is 'Paras'?**

**A** A golden dye

**B** Philosopher's stone

**C** Elixir of life

**D** An alchemy book

When two or more elements combine chemically with one another \_\_\_ is formed?

- A Element
- B Mixture
- C Fluid
- D Compound

**The concept of indivisible particles or atoms in India was proposed by:**

- A** Nagarjuna
- B** Acharya Kanda
- C** Varāhamihira
- D** Rasayana Rishi

## Question

Which of the following represents a compound?



**Which of the following is an element?**

**A** Water

**B** Carbon

**C** Ammonia

**D** Glucose

### Which of the following is not a characteristic of mixtures?

- A** Components retain their individual properties
- B** Can be separated by physical methods
- C** Have a fixed boiling point
- D** May show variable composition

### Which property is common to both elements and compounds?

- A Can be separated by physical means
- B Represented by a chemical formula
- C Composed of two or more substances
- D Can exist as homogeneous or heterogeneous mixtures

**Question**

**Which of the following is not a pure substance?**

**A** Oxygen

**B** Water

**C** Milk

**D** Sodium chloride

**Assertion:** The properties of a compound are same as those of its constituents.  
**Reason:** A compound is always made up of the same elements combined together in a fixed ratio by mass.

- A** Both A and R are correct and R is the correct explanation of A.
- B** Both A and R are correct and R is not the correct explanation of A.
- C** A is correct but R is incorrect
- D** A is incorrect but R is correct

**Assertion:** Solids have definite volume and shape.

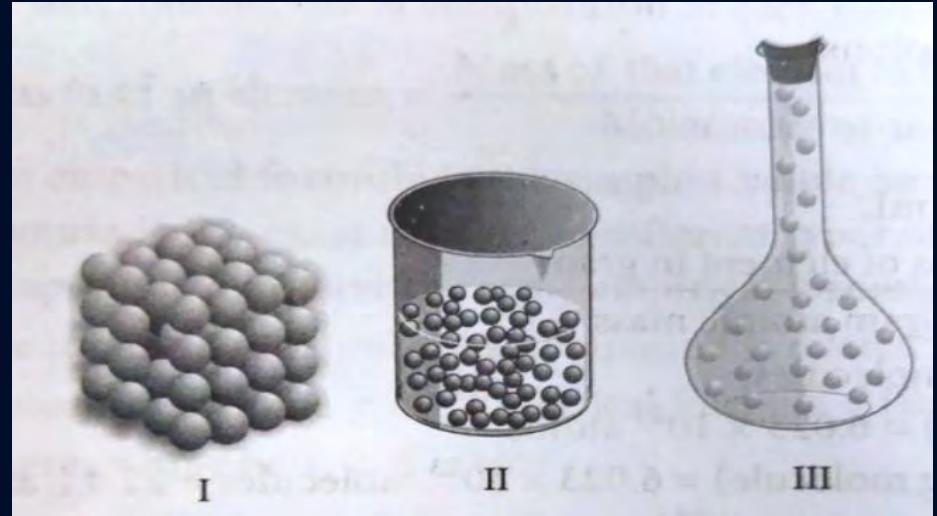
**Reason:** In solids, the constituent particles are very close to each other and there is not much freedom of movement.

- A** If both assertion and reason are true and reason is the correct explanation of assertion.
- B** If both assertion and reason are true and reason is not the correct explanation of assertion.
- C** If assertion is true but reason is false
- D** If both assertion and reason are false.

**Which one of the following pairs have both are present a compound and mixture**

- A** NH<sub>3</sub> and salt solution
- B** Lemon juice and Liquid gum
- C** Ice cream and NaCl
- D** Gun powder and plaster of paris.

**Choose the correct statement about I, II and III.**



- A** I and II have definite volume but III does not have this property
- B** I, II and III are interconvertible by changing the conditions of temperature and pressure
- C** In the particles of I, freedom of movement is large
- D** Both (A) and (B)

**Which one of the following statements is correct?**

- A** Two or more than two atoms of the elements combine and form compound.
- B** The atoms retain their own property when form a compound.
- C** Each substance of a mixture loses its original property.
- D** Each substance of a mixture can be separated by physical or chemical methods.

If mass of one atom is  $3.32 \times 10^{-23}$  g, then calculate number of nucleons (neutrons and protons) present in 2 atoms of the element:

- A 40
- B 20
- C 10
- D  $40 N_A$

**Assertion: Brass is a homogeneous mixture.**

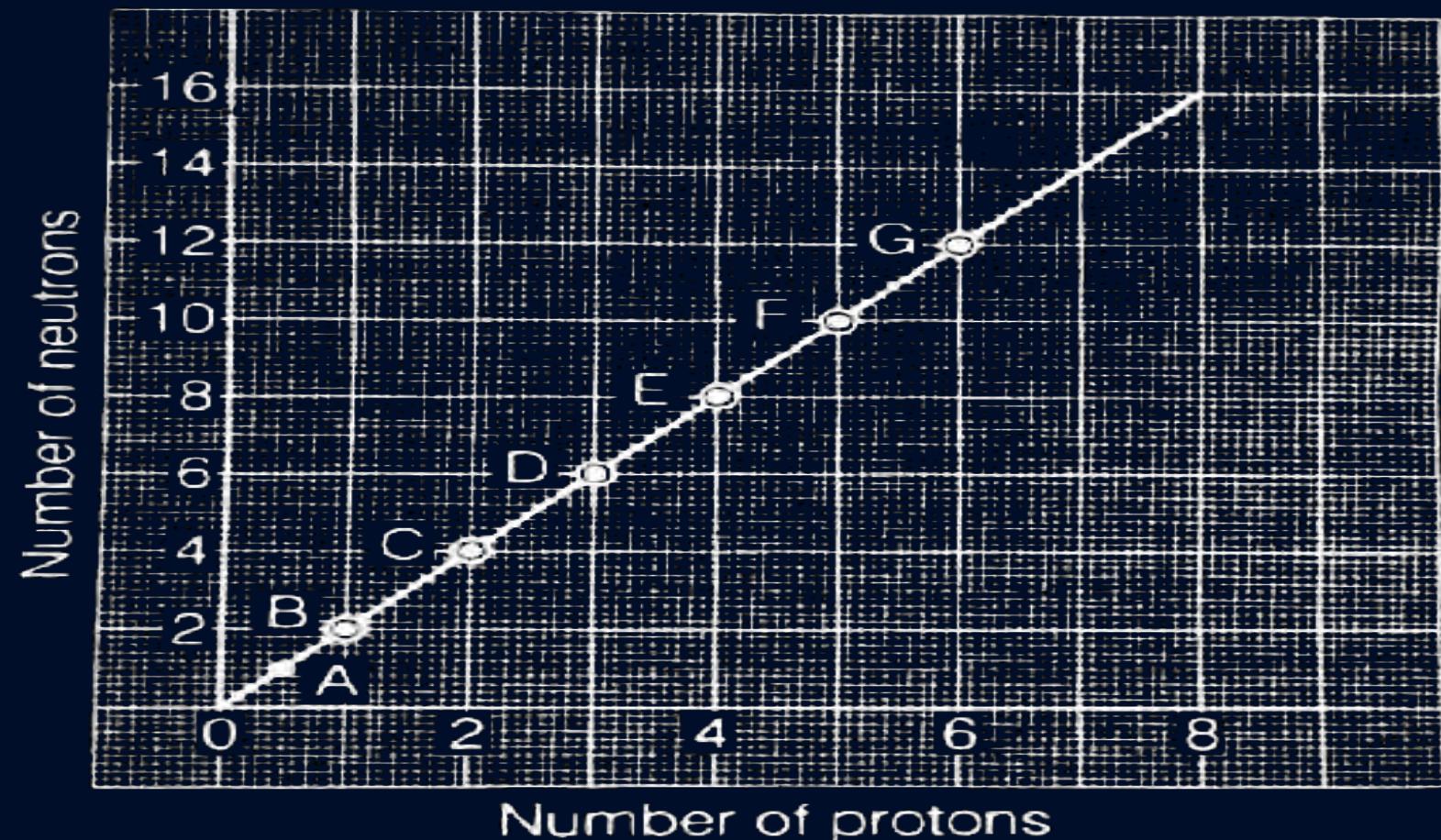
**Reason: Brass is an alloy of copper and zinc.**

- A** Both A and R are correct and R is the correct explanation of A.
- B** Both A and R are correct and R is not the correct explanation of A.
- C** A is correct but R is incorrect
- D** A is incorrect but R is correct

**Question**

In the graph, number of protons are plotted vs number of neutrons for the element A and G and H (hydrogen). Maximum number of neutrons are present in one formula unit of:

- A**  $DH_4E$
- B**  $A_2E$
- C**  $GE$
- D**  $DE_2$



## Question

Classify each of the following as an element, a compound or a mixture.

- (a) Water
- (b) iron
- (c) ice-cream
- (d) sugar
- (e) toothpaste
- (f) silicon dioxide
- (g) sulfur
- (h) cement
- (i) Air
- (j) magnesium oxide

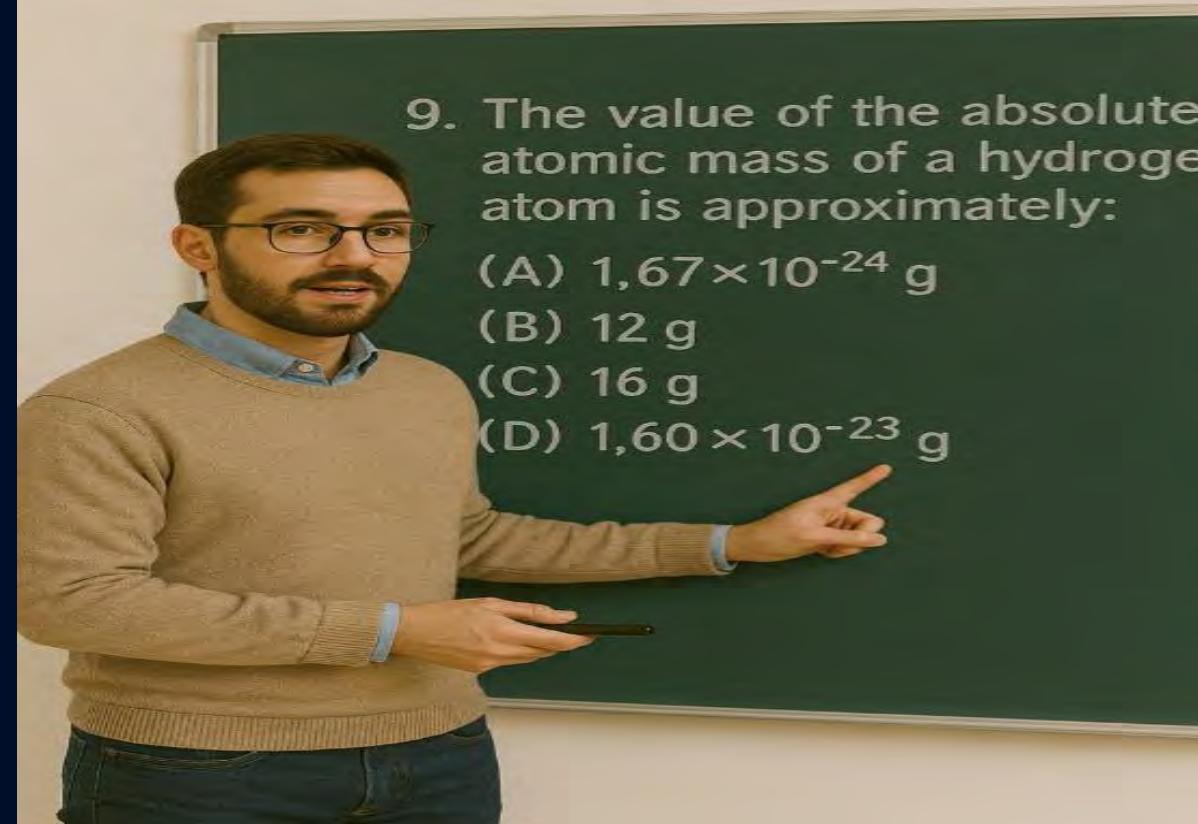
8 1 amu is equal to:

- (A) 1 g
- (B) 1 kg
- (C)  $1.66 \times 10^{-24}$  g
- (D)  $1.66 \times 10^{-23}$  g



9. The value of the absolute atomic mass of a hydrogen atom is approximately:

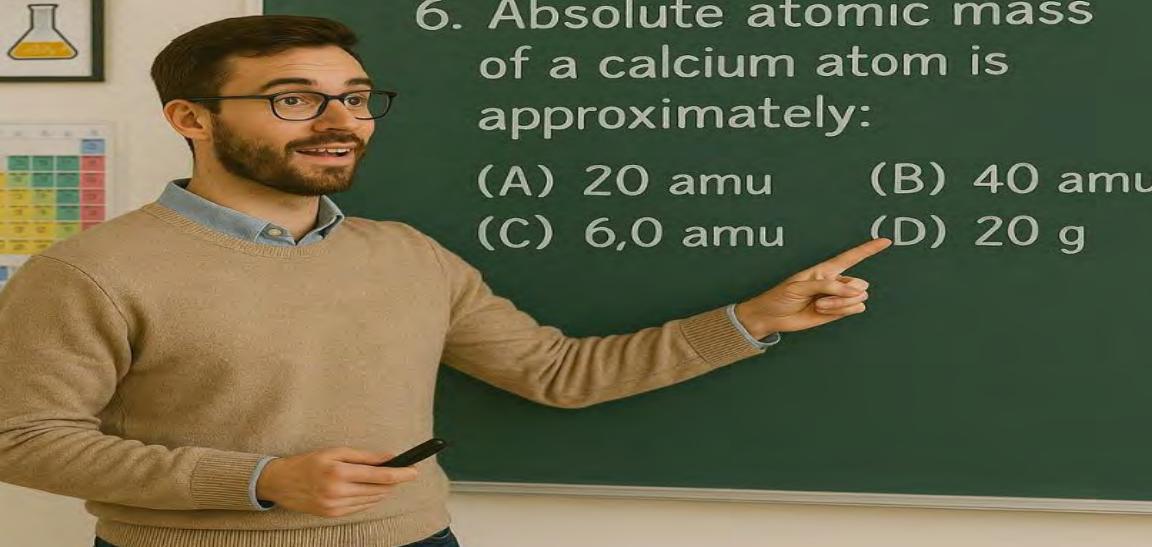
- (A)  $1.67 \times 10^{-24}$  g
- (B) 12 g
- (C) 16 g
- (D)  $1.60 \times 10^{-23}$  g





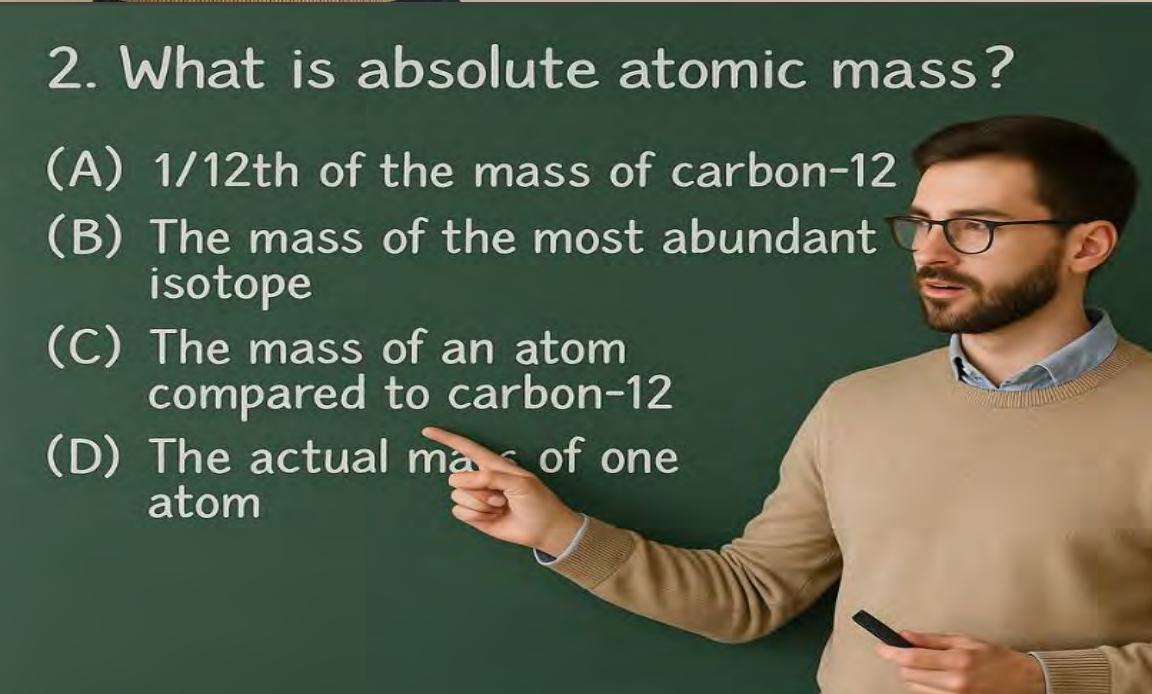
6. Absolute atomic mass of a calcium atom is approximately:

- (A) 20 amu
- (B) 40 amu
- (C) 6.0 amu
- (D) 20 g



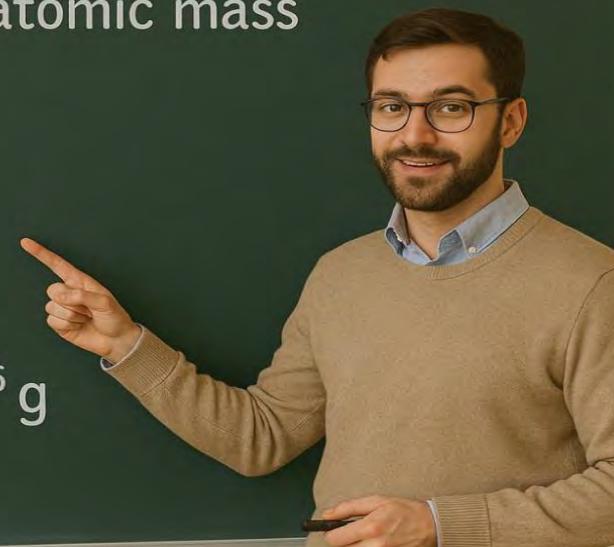
2. What is absolute atomic mass?

- (A) 1/12th of the mass of carbon-12
- (B) The mass of the most abundant isotope
- (C) The mass of an atom compared to carbon-12
- (D) The actual mass of one atom



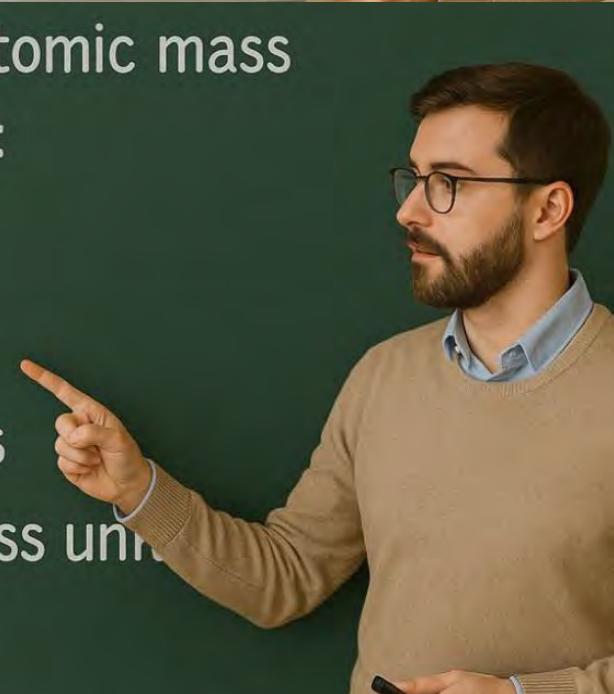
7. The absolute atomic mass of carbon is:

- (A) 12 g
- (B) 12 kg
- (C) 12 u
- (D)  $1,99 \times 10^{-26}$  g



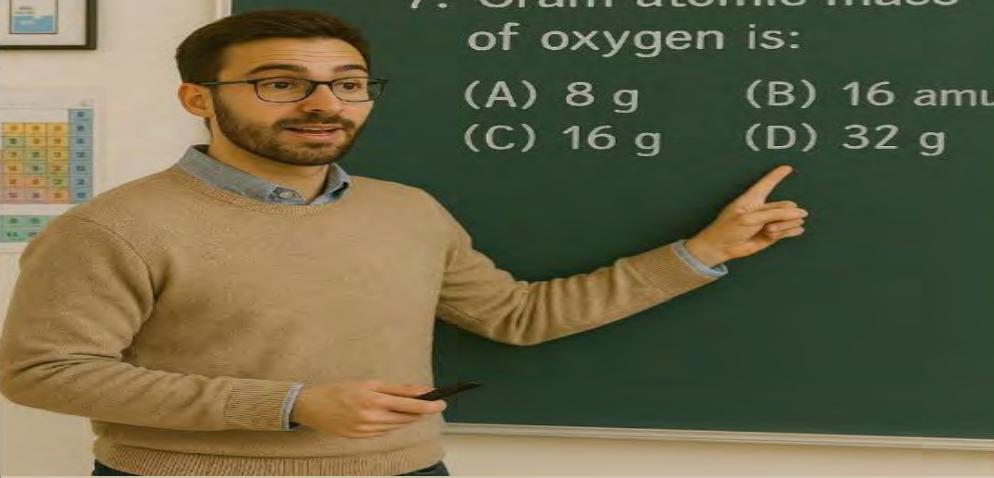
4. The absolute atomic mass is expressed in:

- (A) grams
- (B) kilograms
- (C) centigrams
- (D) atomic mass unit



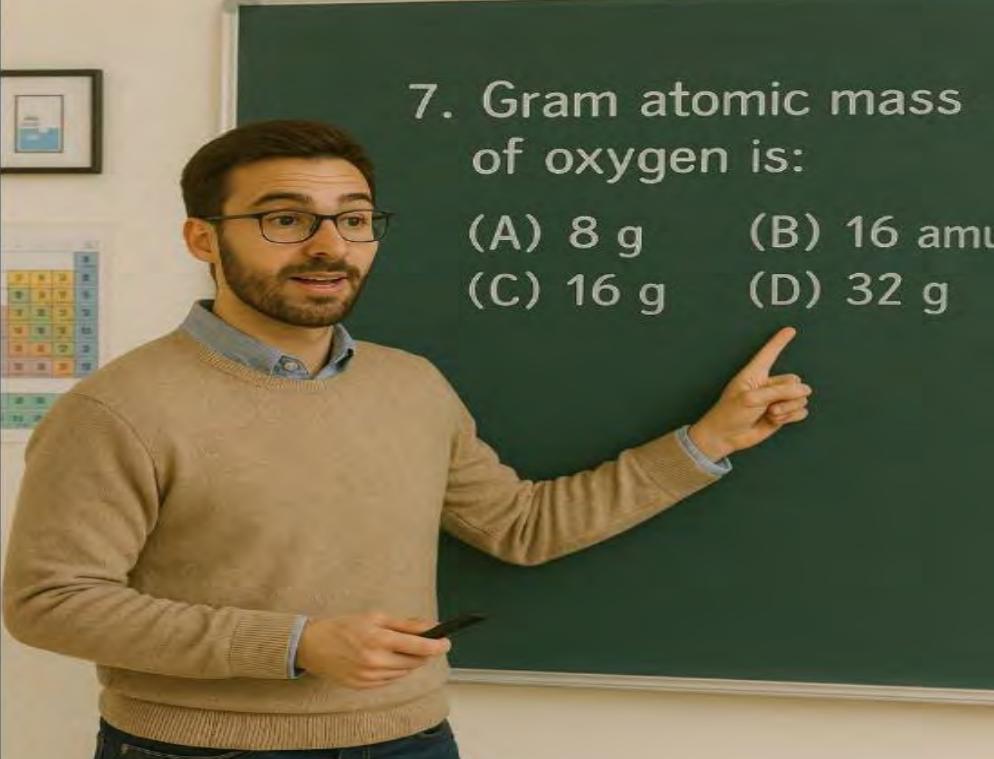
7. Gram atomic mass of oxygen is:

- (A) 8 g      (B) 16 amu
- (C) 16 g      (D) 32 g



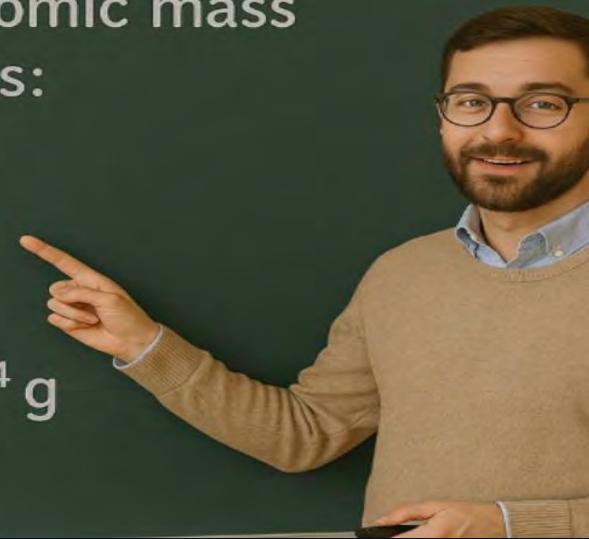
7. Gram atomic mass of oxygen is:

- (A) 8 g      (B) 16 amu
- (C) 16 g      (D) 32 g



8. One gram atomic mass of hydrogen is:

- (A) 1 g
- (B) 1 kg
- (C) 1 u
- (D)  $1,67 \times 10^{-24}$  g



Find new relative atomic mass of sodium if 1 a.m.u. is defined as **1/48 th** of 1 atom of C-12. If Relative atomic mass on conventional scale is 23 .

- A 96
- B 48
- C 92
- D 46

## Question

**What is the unit of absolute atomic mass?**

**A** amu

**B** grams

**C** kg

**D** g/mol

**Question**

**Relative atomic mass is the ratio of the average mass of atoms of an element to:**

**A** 1 amu

**B** 1 gram

**C**  $1/12^{\text{th}}$  of mass of C-12 atom

**D** 1 mole

## Question

What is the relative atomic mass of oxygen?

A 16

B 32

C 8

D 12

**Question**

**What is the absolute atomic mass of hydrogen approximately?**

**A** 1 g

**B**  $1.67 \times 10^{-24}$  g

**C**  $1.67 \times 10^{-27}$  kg

**D** Both b and c

**Question**

The gram atomic mass of nitrogen is :

- A** 14 g
- B** 7 g
- C** 28 g
- D** 1 g

**Which of the following is true for relative atomic mass?**

- A** It has units
- B** It is a ratio and has no units
- C** Measured in grams
- D** Measured in kilograms

## Question

Which is the correct value for Avogadro's number?

A  $6.022 \times 10^{22}$

B  $6.022 \times 10^{24}$

C  $6.022 \times 10^{23}$

D  $3.011 \times 10^{23}$

## Question

The gram atomic mass of an element is numerically equal to its:

A Absolute mass

B Molecular mass

C Relative atomic mass

D Molar mass

## Question

The absolute atomic mass of carbon is approximately:

A 12 g

B  $1.99 \times 10^{-23}$  g

C  $1.99 \times 10^{-22}$  g

D 12 amu

## Question

**What is the gram atomic mass of sulfur?**

**A** 16 g

**B** 32 g

**C** 64 g

**D** 12 g



**1. Which of the following are isotopes?**

- (A)  $^1\text{H}, ^2\text{H}$
- (B)  $^{12}\text{C}, ^{14}\text{N}$
- (C)  $^{16}\text{O}, ^7\text{O}$
- (D)  $^{40}\text{Ca}, ^{40}\text{K}$



**2. Which of the following are isobars?**

- (A)  $^{23}\text{Na}$
- (B)  $^{32}\text{S}, ^4\text{S}$
- (C)  $^{40}\text{Ca}$
- (D)  $^{15}\text{C}, ^{16}\text{N}$



**3. Which of the following are isotones?**

- (A)  $^{12}\text{C}, ^{14}\text{N}$
- (B)  $^{40}\text{Ar}, ^{40}\text{Ca}$
- (C)  $^{28}\text{Si}, ^{32}\text{S}$
- (D)  $^{40}\text{K}, ^{40}\text{Ar}$



**4. Which of the following are isoelectronic species?**

- (A)  $\text{O}_2^{2-}, \text{F}^-$
- (B)  $\text{Na}^+, \text{Cl}^-$
- (C)  $\text{CO}_2, \text{NO}$
- (D)  $\text{NH}_3, \text{CH}_4$

**Question (NEET 2007)**

An element, X has the following isotopic composition:

$^{200}\text{X}$ : 90%       $^{199}\text{X}$ : 8.0%       $^{202}\text{X}$ : 2.0%

The weighted average atomic mass of the naturally occurring element X is closest to

- A** 201 amu
- B** 202 amu
- C** 199 amu
- D** 200 amu

**Question (NEET 1990)**

Boron has two stable isotopes,  $^{10}\text{B}$  (19%) and  $^{11}\text{B}$  (81%). Calculate average at. wt. of boron in the periodic table.

A 10.8

B 10.2

C 11.2

D 10.0

**Question**

Naturally occurring carbon consists of two isotopes  $^{12}\text{C}(12)$  and  $^{13}\text{C}(13)$ . If atomic weight is taken as 12.01, percentage of  $^{13}\text{C}$  is

- A** 1.10
- B** 98.90
- C** 1.00
- D** 99.00

**Question (JEE Main 2020 (II) NTA)**

Atomic weight of Cl is taken as 35.5. If  $^{35}_{17}Cl$  and  $^{37}_{17}Cl$  are two isotopes, their ratio of abundance will be

**A** 3 : 1

**B** 1 : 3

**C** 1 : 4

**D** 4 : 1

**Find the number of atoms in**

- A** 96 a.m.u. of O,  $^{16}_8O$
- B** 96 a.m.u. of C,  $^{12}_6C$
- C** 96 u of S,  $^{32}_{16}S$
- D** 168 u of Fe,  $^{56}_{26}Fe$

**Find the number of molecules in:**

- (a) 132 a.m.u. of  $\text{CO}_2$ ,      (R.M.M. of  $\text{CO}_2 = 44$ )
- (b) 128 a.m.u. of  $\text{SO}_2$ ,      ( $^{32}_{16}\text{S}$ ,  $^{16}_{8}\text{O}$ )
- (c) 85 u of  $\text{NH}_3$ ,      (R.M.M. of  $\text{NH}_3 = 17$ )

**Statement-I:** Both 12g of carbon and 27 g of aluminium will have  $6.02 \times 10^{23}$  atoms.

**Statement-II:** Gram atomic mass of an element contains Avogadro's number of atoms

- A** Statement-I is true, Statement-II is true; Statement-II is correct explanation for Statement-I.
- B** Statement-I is true, Statement-II is true; Statement-II is not a correct explanation for Statement-I.
- C** Statement-I is true, Statement-II is false
- D** Statement-I is false, Statement-II is true

**Question (NCERT: PL-16 | JEE Main April 5, 2024 (I))**

The incorrect postulates of the Dalton's atomic theory are :

- (A) Atoms of different elements differ in mass.
- (B) Matter consists of divisible atoms.
- (C) Compounds are formed when atoms of different element combine in a fixed ratio.
- (D) All the atoms of given element have different properties including mass.
- (E) Chemical reactions involve reorganisation of atoms.

Choose the correct answer from the options given below :

**A** (B), (D), (E) only

**B** (A), (B), (D) only

**C** (C), (D), (E) only

**D** (B), (D) only

## **Choose the Incorrect Statement about Dalton's Atomic Theory**

- A** Compound are formed when atoms of different elements combine in any ratio
- B** All the atoms of a given element have identical properties including identical mass
- C** Matter consists of indivisible atoms
- D** Chemical reactions involve recorganization of atoms

**Question (NCERT: PL-16 | JEE Main Jan. 07, 2020 (I))**

**Amongst the following statements, that which was not proposed by Dalton was :**

- A** Chemical reactions involve reorganization of atoms. These are neither created nor destroyed in a chemical reaction.
- B** All the atoms of a given element have identical properties including identical mass. Atoms of different elements differ in mass.
- C** When gases combine or reproduced in a chemical reaction they do so in a simple ratio by volume, provided all gases are at the same T and P.
- D** Matter consists of indivisible atoms.

Which of the following pairs are isotopes?

- )  $\frac{12}{6}\text{C}$  and  $\frac{14}{6}\text{C}$
- )  $\frac{20}{10}\text{Ne}$  and  $\frac{20}{6}\text{Na}$
- )  $\frac{35}{17}\text{Cl}$  and  $\frac{37}{18}\text{Ar}$
- )  $\frac{14}{6}\text{C}$  and  $\frac{14}{7}\text{N}$

Which pair are isotones?

- )  $\frac{14}{6}\text{C}$  and  $\frac{15}{7}\text{N}$
- )  $\frac{16}{8}\text{O}$  and  $\frac{17}{9}\text{F}$
- )  $\frac{35}{11}\text{Cl}$  and  $\frac{37}{12}\text{Cl}$

Which pair of species are isobars?

- (A)  $\frac{40}{20}\text{Ca}$  and  $\frac{40}{18}\text{Ar}$
- (B)  $\frac{12}{6}\text{C}$  and  $\frac{16}{7}\text{C}$
- (C)  $\frac{16}{8}\text{O}$  and  $\frac{22}{12}\text{Ng}$
- (D)  $\frac{22}{11}\text{Na}$  and  $\frac{24}{12}\text{Mg}$

Which of the following pairs are isoelectronic?

- (A)  $\text{Na}^+$  and  $\text{Ne}$
- (B)  $\text{Cl}^-$  and  $\text{Ar}$
- (C)  $\text{O}^{2-}$  and  $\text{F}^-$

**Question**

For the following isotopes of Mg, abundance is given.

I.	$^{26}_{12}Mg$	0.15
II.	$^{25}_{12}Mg$	0.05
III.	$^{24}_{12}Mg$	0.80

Which has highest number of neutrons in 24.35 g of mixture of isotopes?

**A**

I

**B**

II

**C**

III

**D**

equal

An unknown element X has three isotopes: X-100, X-101, and X-102. The mass of X-100 is 100 u, and X-102 is 102 u. If the average atomic mass is 101.2 u and the abundances of X-100 and X-102 are equal, find the abundance (%) of X-101.

- (A) 20 %
- (B) 40 %
- (C) 60 %

2. An element Z exists in two isotope forms Z-79 and Z-81. Its average atomic mass is 79.9 u. If the atomic mass of Z-81 is slightly uncertain (between 80.9 u and 81.1 u), which range of % abundance is certainly possible for Z-79?

- (A) 50–55 %
- (B) 70–75 %
- (C) 85–90 %
- (D) Cannot be determined without exact

Two isotopes of an element A are accidentally mixed in a laboratory in a 2:3 molar ratio. Their atomic masses are 10 u and 12 u respectively. What is the experimentally observed atomic mass of the mixture?

- (A) 11.0 u                    (B) 11.2 u  
(C) 11.3 u                    (D) 11.5 u

4. In a sample of element M, the isotope M-64 is found to undergo radioactive decay over time. Initial M-64 had 60% abundance and M-66 had 40%. After decay, M-64 abundance drops to 30%. Assuming masses stay constant, how does the average atomic mass of the element change?

- (A) Increases                (B) Decreases  
(C) Remains same            (D) First decreases, then increases

**Find the number of moles in:**

**A**

68 g of  $\text{NH}_3$  (molar mass of  $\text{NH}_3 = 17 \text{ g}$ )

**B**

$18.066 \times 10^{23}$  molecules of  $\text{CO}_2$

**C**

67.2 L at N.T.P/S.T.P.

**D**

45.4 L of  $\text{CH}_4$  at N.T.P.

## Question



**Find the number of molecules in 68g of  $\text{NH}_3$ .**

## Question



**Find mass of 44.8 L of  $\text{C}_2\text{H}_6$  at N.T.P.**

## Question



**Find volume of  $24.088 \times 10^{24}$  molecules of CO at N.T.P. (Molar mass of CO = 28 g)**

**Find the number of g-atoms**

- (a) 70 g of Nitrogen;  $^{14}_7N$
- (b) 288 g of Sulphur;  $^{32}_{16}S$
- (c) 560 g of Fe;  $^{56}_{26}Fe$

**Find the Gram molecules in**

**(a) 84g of CO;**

**(Molar mass of CO = 28gm)**

**Find the Gram ions in**

**( a ) 28 g of  $\text{Li}^+$        ${}^7_3\text{Li}$**

**Statement-I:** 16g each  $O_2$  and  $O_3$  contains  $\frac{N_A}{2}$  and  $\frac{N_A}{3}$  atoms respectively.

**Statement-II:** 16 g  $O_2$  and  $O_3$  contains same no. of atoms

- A** Statement-I is true, Statement-II is true; Statement-II is correct explanation for Statement-I.
- B** Statement-I is true, Statement-II is true; Statement-II is not a correct explanation for Statement-I.
- C** Statement-I is true, Statement-II is false
- D** Statement-I is false, Statement-II is true

**Which one of the followings has maximum number of atoms?**

**A** 1 g of Ag<sub>(s)</sub> [Atomic mass of Ag = 108]

**B** 1 g of Mg<sub>(s)</sub> [Atomic mass of Mg = 24]

**C** 1 g of O<sub>(g)</sub> [Atomic mass of O = 16]

**D** 1 g of Li<sub>(s)</sub> [Atomic mass of Li = 7]

## Question



**Find no of atoms of C , H & total atoms in 90 gm of  $C_2H_6$  ?**

**Number of atoms in 560 g of Fe (atomic mass =  $56 \text{ g mol}^{-1}$ ) is**

- A** twice that of 70 g N, atomic mass of N is 14
- B** half that of 20 g H , atomic mass of H is 1
- C** Both (A) and (B)
- D** None of these

**Question**

The number of atoms present in one mole of an element is equal to Avogadro's number. Which of the following elements contains the greatest number of atoms?

[NCERT Exemplar]

A 4 g He

B 46 g Na

C 0.40 g Ca

D 12 g He

**In which case is the number of molecules of water maximum?**

**(NEET 2018)**

- A** 18 mL of water
- B** 0.18 g of water
- C** 0.00224 L of water vapour at 1 atm and 273 K
- D**  $10^{-3}$  mol of water

The ratio of masses of oxygen and nitrogen in a particular gaseous mixture is 1 : 4. The ratio of the number of their molecules is (JEE Main 2014)

- A 3 : 16
- B 1 : 4
- C 7 : 32
- D 1 : 8

A mixture of gases contains  $\text{H}_2$  and  $\text{O}_2$  gases in the ratio of 1 : 4 (w/w). What is the molar ratio of the two gases in the mixture? (AIPMT 2015)

- A** 16 : 1
- B** 2 : 1
- C** 1 : 4
- D** 4 : 1

## Question

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

- A  $1.800 \times 10^{22}$
- B  $6.026 \times 10^{22}$
- C  $1.806 \times 10^{23}$
- D  $3.600 \times 10^{23}$

**One mole of CO<sub>2</sub> contains**

- A**  $6.02 \times 10^{23}$  atoms of C
- B**  $6.02 \times 10^{23}$  atoms of O
- C**  $18.1 \times 10^{23}$  molecules of CO<sub>2</sub>
- D** 3 g atoms of CO<sub>2</sub>

The number of water molecules is maximum in:

- A 18 gram of water
- B 18 moles of water
- C 18 molecules of water
- D 1.8 gram of water

**Find the**

- (a) number of molecules in 48g of  $\text{CH}_4$ ? ( Molar mass of  $\text{CH}_4$  16 ).**
- (b) number of atoms of each element in 48 g of  $\text{CH}_4$  ?**
- (c) Number of electrons, protons & neutrons in 48 g of  $\text{CH}_4$  ?**

## Question



How many moles of magnesium phosphate,  $\text{Mg}_3(\text{PO}_4)_2$  will contain 0.25 mole of oxygen atoms?

A 0.02

B  $3.125 \times 10^{-2}$

C  $1.25 \times 10^{-2}$

D  $2.5 \times 10^{-2}$

**Statement-I:** Both 12g of carbon and 27 g of aluminium will have  $6.02 \times 10^{23}$  atoms.

**Statement-II:** Gram atomic mass of an element contains Avogadro's number of atoms

- A** Statement-I is true, Statement-II is true; Statement-II is correct explanation for Statement-I.
- B** Statement-I is true, Statement-II is true; Statement-II is not a correct explanation for Statement-I.
- C** Statement-I is true, Statement-II is false
- D** Statement-I is false, Statement-II is true

**Statement-I: One atomic mass unit is defined as one twelfth of the mass of one carbon-12 atoms.**

**Statement-II: Carbon-12 isotopes is the most abundant isotope of carbon and has been chosen as standard.**

- A** Statement-I is true, Statement-II is true; Statement-II is correct explanation for Statement-I.
- B** Statement-I is true, Statement-II is true; Statement-II is not a correct explanation for Statement-I.
- C** Statement-I is true, Statement-II is false
- D** Statement-I is false, Statement-II is true

## 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.**

## Question

The weight of a molecule of the compound  $C_{60}H_{122}$  is

- A**  $1.4 \times 10^{-21} \text{ g}$
- B**  $1.09 \times 10^{-21} \text{ g}$
- C**  $5.025 \times 10^{23} \text{ g}$
- D**  $16.023 \times 10^{23} \text{ g}$

**Which has the maximum number of molecules among the following ? Molar mass of  $\text{CO}_2 = 44 \text{ g}$ ,**

- A** 44 g of  $\text{CO}_2$
- B** 48 g  $\text{O}_2$
- C** 8 g  $\text{H}_2$
- D** 64 g  $\text{SO}_2$

**The ratio of masses of oxygen and nitrogen in a particular gaseous mixture is 1 : 4. The ratio of number of their molecule is**

- A** 1 : 4
- B** 7 : 32
- C** 1 : 8
- D** 3 : 16

**Question (NCERT: PL-18 | JEE Main April 10, 2023 (I))**

The number of molecules are moles in 2.8375 litres of O<sub>2</sub> at STP are respectively

- A**  $7.527 \times 10^{22}$  and 0.250 mol
- B**  $1.505 \times 10^{23}$  and 0.250 mol
- C**  $7.527 \times 10^{23}$  and 0.125 mol
- D**  $7.527 \times 10^{22}$  and 0.125 mol

**Question (NCERT: PL-18 | JEE Main April 10, 2023 (II))****Match List I with List II:****List – I**

- A. 16g of  $\text{CH}_4(\text{g})$
- B. 1 g of  $\text{H}_2(\text{g})$
- C. 1 mole of  $\text{N}_2(\text{g})$
- D. 0.5 mol of  $\text{SO}_2(\text{g})$

**List – II**

- I. Weighs 28 g
- II.  $60.2 \times 10^{23}$  electrons
- III. Weighs 32 g
- IV. Occupies 11.4 L volume at STP

**Choose the correct answer from the options given below :****A**

A-I, B-III, C-II, D-IV

**B**

A-II, B-III, C-IV, D-I

**C**

A-II, B-IV, C-III, D-I

**D**

A-II, B-IV, C-I, D-III

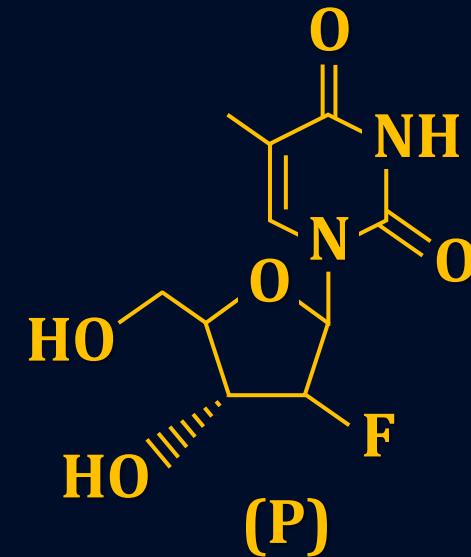
**Question (NCERT: PL-18 | JEE Main April 3, 2025 (I))**

Among  $10^{-9}$  g (each) of the following elements, which one will have the highest number of atom? Element : Pb, Po, Pr and Pt

- A** Po
- B** Pt
- C** Pb
- D** Pt

**Question (NCERT: PL-18 | NV, JEE Main April 2, 2025 (I))**

0.1 mol of the following given antiviral compound (P) will weigh \_\_\_\_\_  $\times 10^{-1}$  g  
(Given : molar mass in g mol<sup>-1</sup> H : 1, C : 12, N : 14, O : 16, F : 19, I : 127)



**Question (NCERT: PL-23 | NV, JEE Main June 27, 2022 (I))**

Two elements A and B which from 0.15 moles of  $A_2B$  and  $AB_3$  type compounds. If both  $A_2B$  and  $AB_3$  weigh equally, then the atomic weight of A is \_\_\_\_\_ times of atomic weight of B.

**Question (NCERT: PL-18 | NV, JEE Main June 25, 2022 (I))**

The number of N atoms in 681 g of  $\text{C}_7\text{H}_5\text{N}_3\text{O}_6$  is  $x \times 10^{21}$ . The value of x is \_\_\_\_\_ ( $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$ ) (Nearest Integer)

**Question (NCERT: PL-18 | JEE Main April 12, 2019 (I))**

5 moles of  $\text{AB}_2$  weigh  $125 \times 10^{-3}$  kg and 10 moles of  $\text{A}_2\text{B}_2$  weigh  $300 \times 10^{-3}$  kg. The molar mass of A ( $M_A$ ) and molar mass of B( $M_B$ ) in  $\text{kg mol}^{-1}$  are :

- A**  $M_A = 10 \times 10^{-3}$  and  $M_B = 5 \times 10^{-3}$
- B**  $M_A = 50 \times 10^{-3}$  and  $M_B = 25 \times 10^{-3}$
- C**  $M_A = 25 \times 10^{-3}$  and  $M_B = 50 \times 10^{-3}$
- D**  $M_A = 5 \times 10^{-3}$  and  $M_B = 10 \times 10^{-3}$

## Question



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

## Question



**Find density of  $\text{CO}_2(\text{g})$  at 4 atm & 300 K.**

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

$2.8 \times 10^{-3}$  mol of  $\text{CO}_2$  is left after removing  $10^{21}$  molecules from its 'x' mg sample. The mass of  $\text{CO}_2$  taken initially is Given :  $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$ .

- A** 196.2 mg
- B** 98.3 mg
- C** 150.4 mg
- D** 48.2 mg

## Question



(a) 1 mol  $\text{SO}_2$  reacts with excess of  $\text{H}_2\text{O}$ , then moles of S formed is:



(b) 5 moles of  $\text{SO}_2$ , find moles of S formed in above reaction.

## Question

Maximum moles of  $\text{Ba}_3(\text{PO}_4)_2$  that can be obtained in the following reaction on taking 4 mole of  $\text{Na}_3\text{PO}_4$  and excess of  $\text{BaCl}_2$  is \_\_\_\_.



- A 1
- B 2
- C 3
- D 6

## Question

How many grams of  $\text{SO}_3$  are produced from 1 mole of  $\text{S}_8$ ?

- A** 1280.0
- B** 640.0
- C** 960.0
- D** 320.0

**What is the volume of  $\text{CO}_2$  liberated (in litres) at 1 atmosphere and  $0^\circ\text{C}$  when 10 g of 100% pure calcium carbonate is treated with excess dilute sulphuric acid?**  
**(Atomic mass: Ca : 40, C : 12, O : 16)**

- A** 0.224
- B** 2.24
- C** 22.4
- D** 224
- E** 11.2

## Question



Find the volume of  $\text{CO}_2$  formed if 5L of propane undergoes combustion with excess of  $\text{O}_2$ ?

**Question (NEET 2014)**

**Equal masses of  $\text{H}_2\text{O}_2$  and methane have been taken in a container of volume V at temperature  $27^\circ\text{C}$  in identical conditions. The ratio of the volumes of gases  $\text{H}_2 : \text{O}_2 : \text{methane}$  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  $\text{Ag}_{(s)}$  [Atomic mass of Ag = 108 ]

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

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

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

**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  $\text{H}_2$  and  $\text{O}_2$  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  $\text{CO}_2$ **B** 48 g  $\text{O}_3$ **C** 8 g  $\text{H}_2$ **D** 64 g  $\text{SO}_2$

**Question (NEET 2010)**

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

A  $6.026 \times 10^{22}$

B  $1.806 \times 10^{23}$

C  $3.6 \times 10^{23}$

D  $1.8 \times 10^{22}$

**Question (NEET 2004)**

The maximum number of molecules is present in

A 15 L of  $\text{H}_2$  gas at STP

B 5 L of  $\text{N}_2$  gas at STP

C 0.5 g of  $\text{H}_2$  gas

D 10 g of  $\text{O}_2$  gas

**Question (NEET 2002)****Which has maximum molecules?**

**A** 7 g  $\text{N}_2$

**B** 2 g  $\text{H}_2$

**C** 16 g  $\text{NO}_2$

**D** 16 g  $\text{O}_2$

**Question (NEET 2001)****Specific volume of cylindrical virus particle is  $6.02 \times 10^{-2}$  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**  $1.54 \times 10^4$  kg / mol

**C**  $3.08 \times 10^4$  kg / mol

**D**  $3.08 \times 10^3$  kg / mol

**Question (NEET 1999)**

The number of atoms in 4.25 g of  $\text{NH}_3$  is approximately

A  $4 \times 10^{23}$

B  $2 \times 10^{23}$

C  $1 \times 10^{23}$

D  $6 \times 10^{23}$

**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  $\text{N}_3^-$  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  $6.02 \times 10^{24}$  CO molecules is

A 10 g molecules

C 1 g molecule

B 5 g molecules

D 0.5 g molecules

**Question (NEET 1989)**

The number of oxygen atoms in 4.4 g of  $\text{CO}_2$  is

A  $1.2 \times 10^{23}$

B  $6 \times 10^{22}$

C  $6 \times 10^{23}$

D  $12 \times 10^{23}$

**The volume of oxygen required for complete combustion of 20 ml of ethene is**

- A** 30 ml
- B** 60 ml
- C** 40 ml
- D** 50 ml

The volume of gas at STP produced by 100 g of  $\text{CaC}_2$  with water.

A 70 litre

B 35 litre

C 17.5 litre

D 22.4 litre

**Volume of  $\text{CO}_2$  obtained at STP by the complete decomposition of 9.85 g of  $\text{BaCO}_3$  is:**

- A** 2.24 lit
- B** 1.12 lit
- C** 0.84 lit
- D** 0.56 lit

Mujhe percentage purity ke saare sawal aate hain

Weekend pe TSP dekhne ki training do



### QUESTION 1

A student obtained 15 g of pure substance from a 20 g impure sample. What is the percentage purity?

- A. 70 %
- B. 75 %
- C. 80 %
- D. 85 %

Answer hai:  
75%!



### QUESTION 2

5 g of impure sodium chloride contains 4.5 g of pure NaCl. What is the percentage purity?

- A. 88 %
- B. 90 %
- C. 92 %
- D. 95 %

Answer:  
B - 90%!



### QUESTION 3

25 g of sample gave only 16 g of pure product. Calculate the % purity.

- A. 64 %
- B. 65 %
- C. 66 %
- D. 67 %

Next time Rookie.  
Pookie will respond



**Question (NCERT: PL-20 | NV, JEE Main April 04, 2025 (II))**

The amount of calcium oxide produced on heating 150 kg limestone (75% pure) is \_\_\_\_\_ kg. (Nearest integer)

Given : Molar mass (in g mol<sup>-1</sup>) of Ca - 40, O - 16, C - 12.

# PERCENTAGE YIELD

## Kiye ya nahi KIYE?

Q. Actual yield always equals theoretical yield?



- (A) Sahi  
(B) Galat

2. Percentage yield = 90%. Which is correct?

- (A) Actual = theoretical  
(B) Actual > theoretical  
(C) Actual < theoretical  
(D) Actual = zero

What's the percentage yield?



3. What's the percentage yield?

- (A) 115%  
(B) 90%  
(C) 85%  
(D) 22%



4. How do you increase percentage yield?

- (A) Buy a calculator  
(B) Use more reactant  
(C) Use sunblock  
(D) Lose more Product



**Question (NCERT: PL-20 | NV, JEE Main July 25, 2022 (II))**

56.0 L of nitrogen gas is mixed with excess of hydrogen gas and it is found that 20 L of ammonia gas is produced. The volume of unused nitrogen gas if found to be \_\_\_\_\_ L.

Mass of magnesium required to produce 220 mL of hydrogen gas at STP on reaction with excess of dil. HCl is Given : Molar mass of Mg is  $24 \text{ g mol}^{-1}$ .

A 235.7 g

B 0.24 mg

C 236 mg

D 2.444 g

**Question (NCERT: PL-20 | NV, JEE Main Jan. 27, 2025 (I))**

Xg of benzoic acid on reaction with aq.  $\text{NaHCO}_3$  release  $\text{CO}_2$  that occupied 11.2 L volume at STP. X is \_\_\_\_\_ g.

What amount of bromine will be required to convert 2 g of phenol into 2, 4, 6-tribromophenol?

(Given molar mass in g mol<sup>-1</sup> of C, H, O, Br are 12, 1, 16, 80 respectively)

A 10.22 g

B 6.0 g

C 4.0 g

D 20.44 g

**Question (NCERT: PL-22 | NV, JEE Main Jan. 27, 2024 (I))**

Mass of methane required to produce 22 g of  $\text{CO}_2$  after complete combustion is \_\_\_\_\_ g.

[Given Molar mass in  $\text{g mol}^{-1}$ ; C = 12.0, H = 1.0, O = 16.0]

**Question (NCERT: PL-18 | NV, JEE Main April 13, 2023 (II))**

1 g of a carbonate ( $M_2CO_3$ ) on treatment with excess HCl produces 0.01 mol of  $CO_2$ .  
The molar mass of  $M_2CO_3$  is \_\_\_\_\_ g  $mol^{-1}$ . (Nearest integer)

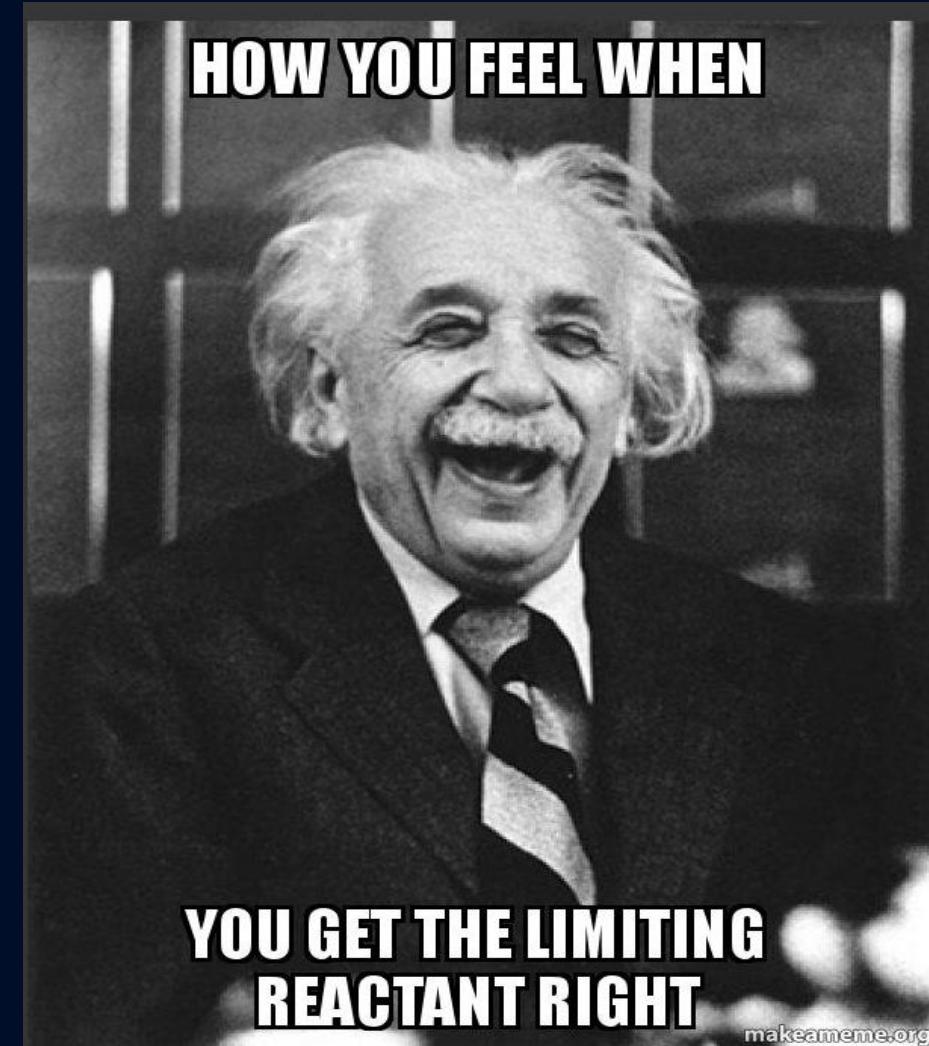
**Question (NCERT: PL-18 | NV, JEE Main April 11, 2023 (II))**

The volume of hydrogen liberated at STP by treating 2.4 g magnesium with excess of hydrochloric acid \_\_\_\_\_  $\times 10^{-2}$  L.

Given : Molar volume of gas is 22.4 L at STP. Molar mass of magnesium is 24 g mol<sup>-1</sup>.

1 mole each of  $\text{N}_2$  and  $\text{H}_2$  react to form  $\text{NH}_3$ . Calculate moles of  $\text{NH}_3$  formed.

[NCERT Exemplar]



**QUESTION – (AIPMT 2014)**

**When 22.4 litres of  $\text{H}_2(\text{g})$  is mixed with 11.2 litres of  $\text{Cl}_2(\text{g})$ , each at STP, the moles of  $\text{HCl}(\text{g})$  formed is equal to:**

- A** 0.5 mol of  $\text{HCl}(\text{g})$
- B** 1.5 mol of  $\text{HCl}(\text{g})$
- C** 1 mol of  $\text{HCl}(\text{g})$
- D** 2 mol of  $\text{HCl}(\text{g})$

The reaction  $2C + O_2 \longrightarrow 2CO$ . Is carried out by taking 24 g of carbon and 96 g  $O_2$ .  
Find out Limiting Reagent & [NCERT Exemplar]

- (a) Which reactant is left in excess?
- (b) How many moles of CO are formed?
- (c) How many grams of other reactant is left ?

**QUESTION – (AIPMT 2014)**

**1.0 g of magnesium is burnt with 0.56 g  $O_2$  in a closed vessel. Which reactant is left in excess and how much:**

**(At. Wt. Mg = 24; O = 16)**

- A** Mg, 0.44 g
- B**  $O_2$ , 0.28 g
- C** Mg, 0.16 g
- D**  $O_2$ , 0.16 g

**Question (NCERT: PL-20 | NV, JEE Main Jan. 24, 2025 (I))**

Consider the following reaction occurring in the blast furnace.



'x' kg of iron is produced when  $2.32 \times 10^3$  kg  $\text{Fe}_3\text{O}_4$  and  $2.8 \times 10^2$  kg CO are brought together in the furnace. The value of 'x' is \_\_\_\_\_ (nearest integer)

{Given : Molar mass of  $\text{Fe}_3\text{O}_4$  = 232 g mol<sup>-1</sup>

Molar mass of CO = 28 g mol<sup>-1</sup>

Molar mass of Fe = 56 g mol<sup>-1</sup>}

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

In the given reaction,  $X + Y + 3Z \rightleftharpoons XYZ_3$  if one mole of each of X and Y with 0.05 mol of Z gives compound  $XYZ_3$ . (Given : Atomic masses of X, Y and Z are 10, 20 and 30 amu, respectively). The yield of  $XYZ_3$  is \_\_\_\_\_ g. (Nearest integer)

## Question



Find % age of Ca in  $\text{CaBr}_2$ ?

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

Thyroxine, the hormone has given below structure



The percentage of iodine in thyroxine is \_\_\_\_\_ %. (nearest integer)

(Given molar mass in g mol<sup>-1</sup> C : 12, H : 1, O : 16, N : 14, I : 127)

**Question (NV, JEE Main Jan. 24, 2023 (I))**

Uracil is base present in RNA with the following structure. % of N in uracil is \_\_\_\_\_.



Given : Molar mass N = 14 g mol<sup>-1</sup>; O = 16 g mol<sup>-1</sup>; C = 12 g mol<sup>-1</sup>; H = 1 g mol<sup>-1</sup>

**Question (NCERT: PL-19 | NV, JEE Main April 11, 2023 (I))**

A solution of sugar is obtained by mixing 200 g of its 25% solution and 500 g of its 40% solution (both by mass). The mass percentage of the resulting sugar solution is \_\_\_\_\_. (Nearest integer)

## Question



If 11.2 L of  $\text{CO}_2(\text{g})$  & 5.6 L of  $\text{CO}(\text{g})$  is present in gaseous mixture at N.T.P. find volume % of  $\text{CO}_2(\text{g})$ ?

**Assertion (A):** Antoine Lavoisier's experiments on combustion led to the formulation of the Law of Conservation of Mass.

**Reason (R):** In a chemical reaction, total mass of products is always greater than total mass of reactants due to mass of heat released.

- (A) Both A and R are true, and R is the correct explanation of A.
- (B) Both A and R are true, but R is not the correct explanation of A.
- (C) A is true, but R is false.
- (D) A is false, but R is true.

Antoine Lavoisier emphasized **careful measurement** in chemical changes. Which of the following instruments or techniques would have been crucial to validate the law?

- (A) pH meter
- (B) Analytical balance
- (C) Colorimeter
- (D) Titration burette

## Question



**What mass of silver nitrate will react with 5.85g of sodium chloride to produce 14.35 g of silver chloride and 8.5 g of sodium nitrate, if the law of conservation of mass is true ?**

**QUESTION – (AIPMT 2009)**

**10 g of hydrogen and 64 g of oxygen were filled in a steel vessel and exploded. Amount of water produced in this reaction will be:**

- A** 2 mole
- B** 3 mole
- C** 4 mole
- D** 1 mole

**QUESTION – (Karnataka CET (Med.) 2012)**

20.0 kg of  $\text{N}_{2(\text{g})}$  and 3.0 kg of  $\text{H}_{2(\text{g})}$  are mixed to produce  $\text{NH}_{3(\text{g})}$ . The amount of  $\text{NH}_{3(\text{g})}$  formed is:

- A** 17 kg
- B** 34 kg
- C** 20 kg
- D** 3 kg
- E** 23 kg

## Question



Identify dihydrogen ( $\text{H}_2$ ) as a limiting reagent in the following reaction mixtures.

Molar mass of  $\text{H}_2 = 2 \text{ g}$  & Molar mass of  $\text{N}_2 = 28 \text{ g}$

- A** 56 g of  $\text{N}_2$  + 10 g of  $\text{H}_2$
- B** 35 g of  $\text{N}_2$  + 8 g of  $\text{H}_2$
- C** 14 g of  $\text{N}_2$  + 4 g of  $\text{H}_2$
- D** 28 g of  $\text{N}_2$  + 6 g of  $\text{H}_2$

**Question (NCERT: PL-19 | JEE Main April 08, 2019 (I))**

The percentage composition of carbon by mole in methane is :

- A** 75 %
- B** 80 %
- C** 25 %
- D** 20 %

**Question (Online JEE Main April 09, 2016)**

5 L of an alkane requires 25 L of oxygen for its complete combustion. If all volumes are measured at constant temperature and pressure, the alkane is :

- A** Isobutane
- B** Ethane
- C** Butane
- D** Propane

**Question (NCERT: PL-20 | NV, JEE Main Jan. 27, 2025 (I))**

When 81.0 g of aluminium is allowed to react with 128.0 g of oxygen gas, the mass of aluminium oxide produced in grams is \_\_\_\_\_. (Nearest integer)

**Given :**

Molar mass of Al is 27.0 g mol<sup>-1</sup>

Molar mass of O is 16.0 g mol<sup>-1</sup>

**Question (NCERT: PL-20 | NV, JEE Main Feb. 01, 2024 (I))**

Consider the following reaction :



If 72 mmol of  $\text{PbCl}_2$  is mixed with 50 mmol of  $(\text{NH}_4)_3 \text{PO}_4$ , then the amount of  $\text{Pb}_3(\text{PO}_4)_2$  formed is \_\_\_\_\_ mmol (nearest integer)

## Question



If 6.3 g of  $\text{NaHCO}_3$  are added to 15.0 g of  $\text{CH}_3\text{COOH}$  solution, the residue is found to weigh 18.0 g. What is the mass of  $\text{CO}_2$  released in the reaction?

Which of the following statements align with the Law of Conservation of Mass?

- (A) In a chemical reaction, atoms can disappear.
- (B) The total mass of a closed system remains constant.
- (C) Combustion reactions often lead to increase in system mass.
- (D) Mass is neither created nor destroyed during chemical reactions.

Why was Lavoisier's conclusion revolutionary for chemistry at the time?

- (A) It opposed the then-dominant "phlogiston" theory.
- (B) It introduced the idea of atoms for the first time.
- (C) It used qualitative observations only.
- (D) It dismissed the role of oxygen in combustion.

### **Q1. Assertion & Reason**

**Assertion (A):** A natural and a synthetic sample of cupric carbonate have different elemental compositions by mass.

**Reason (R):** The source of a compound affects its chemical composition.

Options:

- (A) Both A and R are true, and R is the correct explanation of A.
- (B) Both A and R are true, but R is not the correct explanation of A.
- (C) A is false, but R is true.
- (D) Both A and R are false.



Which of the following are true about the Law of Definite Proportions?

- (A) It applies only to compounds made from non-metals.
- (B) The mass ratio of elements in a pure compound is constant.
- (C) Cupric carbonate from any source will always show the same % of copper, carbon, and oxygen.
- (D) Joseph Proust gave the law using cuprous chloride.

**Column I**

- (A) Joseph Proust
- (B) Fixed elemental ratio
- (C) Natural sample
- (D) Different composition

**Column II**

- (P) Law of Multiple Proportions
- (Q) Cupric Carbonate
- (R) Law of Definite Composition
- (S) Mixtures

Choose the correct matching:

Mark the following statements True or False:

- (i) The law holds even when samples are obtained from different geographical regions.
- (ii) It contradicts Dalton's Atomic Theory.
- (iii) It applies only to ionic compounds.
- (iv) Cupric carbonate has different composition when made in lab.

## Question



**2.16 g of copper metal when treated with nitric acid followed by ignition of the nitrate gave 2.70 g of copper oxide. In another experiment 1.15 g of copper oxide upon reduction with hydrogen gave 0.92 g of copper. Show that the above data illustrate the Law of Definite Proportions.**

## Question



6.488 g of lead combine directly with 1.002 g of oxygen to form lead peroxide ( $\text{PbO}_2$ ). Lead peroxide is also produced by heating lead nitrate and it was found that the percentage of oxygen present in lead peroxide is 13-38 percent. Use these data to illustrate the law of constant composition.

## Question



A and B combine to form 4 compounds P, Q, R, S

$0.6 \text{ g A} + 0.8 \text{ g B} \rightarrow 1.4 \text{ g of P}$

$9 \text{ g A} + 24 \text{ g B} \rightarrow 33 \text{ g}$

$40 \text{ g A} + 160 \text{ g B} \rightarrow 200 \text{ g R}$

$18 \text{ g A} + 93.6 \text{ g B} \rightarrow 111.6 \text{ g}$

Show that it follows law of multiple proportions.

## Question



**Two oxides of metal contain 27.6% & 30% of oxygen. If the formula of first oxide is  $M_3O_4$ . Find formula of second oxide.**

**Who proposed the law of gaseous volumes?**

- a) Avogadro
- b) Boyle
- c) Charles
- d) Gay Lussac

**In which year was Gay Lussac's law proposed?**

- a) 1803
- b) 1808
- c) 1811
- d) 1823

**According to Gay Lussac's Law, gases combine in a ratio of their:**

- a) Masses
- b) Molar masses
- c) Volumes
- d) Densities

## Which scientist's work later explained Gay Lussac's Law in 1811?

- a) Boyle
- b) Avogadro
- c) Dalton
- d) Newton

Gay Lussac's Law holds true when gases are at:

- a) Different temperatures and pressures
- b) High temperatures only
- c) Same temperature and pressure
- d) Low pressure only

## Question



If 5 L of  $\text{H}_2(\text{g})$  combine with 5 L of  $\text{Cl}_2(\text{g})$  to form  $\text{HCl}(\text{g})$ . Find volume of  $\text{HCl}(\text{g})$  formed.

What does Avogadro's Law state?

- a) Equal volumes of gases have equal masses
- b) Equal volumes of all gases at the same temperature and pressure contain equal number of molecules
- c) Equal volumes of gases occupy same mass
- d) Equal number of molecules occupy equal weight

Who proposed the distinction between atoms and molecules?

- a) Dalton
- b) Cannizzaro
- c) Gay Lussac
- d) Avoqadro

Why was Avogadro's theory initially not accepted widely?

- a) It was too complex
- b) It lacked mathematical proof
- c) Molecules containing two atoms were not recognised
- d) Avogadro never published it

**When was the first international chemistry conference held that revived Avogadro's ideas?**

- a) 1811
- b) 1830
- c) 1860
- d) 1900

**When was the first international chemistry conference held that revived Avogadro's ideas?**

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**Who presented the importance of Avogadro's work at the Karlsruhe Conference?**

- a) Joseph Proust
- b) Cannizzaro
- c) Gay Lussac
- d) Lavoisier

If in two containers of  $\text{N}_2(\text{g})$  and  $\text{O}_3(\text{g})$  having volume 5L and 20 L at same temperature and pressure. Find

- (i) Ratio of number of moles.
- (ii) Ratio of number of molecules.
- (iii) Ratio of number of atoms of gas

## Question



Equal masses of oxygen, hydrogen and methane are taken in identical conditions. What is the ratio of the volumes of the gases under identical conditions?

A 16 : 1 : 8

B 1 : 16 : 2

C 1 : 16 : 8

D 2 : 16 : 1

**QUESTION – (AIIMS 2006)**

The empirical formula of a compound is  $\text{CH}_2\text{O}$ . Its molecular weight is 180. The molecular formula of compound is:

- A**  $\text{C}_4\text{HO}_4$
- B**  $\text{C}_3\text{H}_6\text{O}_3$
- C**  $\text{C}_6\text{H}_{12}\text{O}_6$
- D**  $\text{C}_5\text{H}_{10}\text{O}_5$

## Question



A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molar mass is 98.96 g. What are its empirical and molecular formulas ?

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

The elemental composition of a compound is 54.2% C, 9.2% H and 36.6% O. If the molar mass of the compound is  $132 \text{ g mol}^{-1}$ , the molecular formula of the compound is: [Given: The relative atomic mass of C : H : O = 12 : 1 : 16]

- A**  $\text{C}_4\text{H}_9\text{O}_3$
- B**  $\text{C}_6\text{H}_{12}\text{O}_6$
- C**  $\text{C}_6\text{H}_{12}\text{O}_3$
- D**  $\text{C}_4\text{H}_8\text{O}_2$

**QUESTION – (AIIMS 1999)**

60 g of organic compound on analysis gave following results C = 24 g, H = 4 g and O = 32 g. The empirical formula of compound is:

- A**  $\text{CH}_2\text{O}$
- B**  $\text{CH}_2\text{O}_2$
- C**  $\text{C}_2\text{H}_2\text{O}$
- D**  $\text{C}_2\text{H}_2\text{O}_2$

Determine the empirical formula of Kevlar, used in making bullet proof vests, is 70.6% C, 4.2% H, 11.8% N and 13.4% O:

- A  $C_7H_5NO_2$
- B  $C_7H_5N_2O$
- C  $C_7H_9NO$
- D  $C_7H_5NO$

An organic compound has 42.1% carbon, 6.4% hydrogen and remainder is oxygen. If its molecular weight is 342, then its molecular formula is :

- A**  $C_{11}H_{18}O_{12}$
- B**  $C_{12}H_{20}O_{12}$
- C**  $C_{14}H_{20}O_{10}$
- D**  $C_{12}H_{22}O_{11}$

## Question



Two oxides of metal contain 27.6% & 30% of oxygen. If the formula of first oxide is  $M_3O_4$ . Find formula of second oxide.

## Question



Two oxides of metal contain 27.6% & 30% of oxygen. If the formula of first oxide is  $M_3O_4$ . Find formula of second oxide.

**Question (NCERT: PL-19 | NV, JEE Main Jan. 25, 2023 (II))**

Number of hydrogen atoms per molecule of a hydrocarbon A having 85.8% carbon is \_\_\_\_\_ (Given : Molar mas of A =  $84 \text{ g mol}^{-1}$ )

Compound A contains 8.7% Hydrogen 74% Carbon and 17.3% Nitrogen. The molecular formula of the compound is,

Given : Atomic masses of C, H and N are 12, 1 and 14 amu respectively.  
The moalr mass of the compound A is 162 g mol<sup>-1</sup>.

- A  $C_4H_6N_2$
- B  $C_2H_3N$
- C  $C_5H_7N$
- D  $C_{10}H_{14}N_2$

A metal chloride contains 55.0% of chlorine by weight. 100 mL vapours of the metal chloride at STP weight 0.57 g. The molecular formula of the metal chloride is (Given : Atomic mass of chlorine is 35.5 u)

- A**  $\text{MCl}_2$
- B**  $\text{MCl}_4$
- C**  $\text{MCl}_3$
- D**  $\text{MCl}$

**Question**

The hydrated salt  $\text{Na}_2\text{CO}_3 \cdot x\text{H}_2\text{O}$  undergoes 63% loss in mass on heating and becomes anhydrous. The value of  $x$  is:

- A** 10
- B** 12
- C** 8
- D** 18

## 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<sub>2</sub>O
- B** NO
- C** N<sub>2</sub>O<sub>3</sub>
- D** NO<sub>2</sub>

**Question**

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**  $A_2B_3$

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 H atoms are replaced by H atoms is

- A** 15 kg
- B** 37.5 kg
- C** 7.5 kg
- D** 10 kg

On combustion 0.210 g of an organic compound containing C, H and O gave 0.127 g  $\text{H}_2\text{O}$  and 0.307 g  $\text{CO}_2$ . 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

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

An organic compound weighing 500 mg, produced 220 mg of  $\text{CO}_2$ , on complete combustion. The percentage composition of carbon in the compound is \_\_\_\_\_. (% nearest integer)

On complete combustion 1.0 g of an organic compound (X) gave 1.46 g of  $\text{CO}_2$  and 0.567 g of  $\text{H}_2\text{O}$ . The empirical formula mass of compound (X) is \_\_\_\_\_ g.  
(Given molar mass in  $\text{g mol}^{-1}$  C : 12, H : 1, O : 16)

- A 30
- B 45
- C 60
- D 15

## Question

What percentage of oxygen is present in the compound  $\text{CaCO}_3 \cdot 3\text{Ca}_3(\text{PO}_4)_2$ ?

- A** 23.3%
- B** 45.36%
- C** 41.94%
- D** 17.08%

**Question**

A 6.85 g sample of the hydrate  $\text{Sr}(\text{OH})_2 \cdot x\text{H}_2\text{O}$  is dried in an oven to give 3.13 g of anhydrous  $\text{Sr}(\text{OH})_2$ . 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  $\text{CO}_2$  and 0.126 g of  $\text{H}_2\text{O}$  on complete combustion. If the % of carbon is 24 then the % hydrogen is \_\_\_\_\_  $\times 10^{-1}$ . (Nearest integer)

The complete combustion of 0.492 g of an organic compound containing 'C', 'H' and 'O' gives 0.793 g of  $\text{CO}_2$  and 0.442 g of  $\text{H}_2\text{O}$ . 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. Given 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**  $\text{CH}_3\text{COOH}$
- B**  $\text{HCHO}$
- C**  $\text{CH}_3\text{OOCH}_3$
- D**  $\text{CH}_3\text{CHO}$

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

The hydrocarbon (X) with molar mass  $80 \text{ g mol}^{-1}$  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

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  $C_2H_4O_3$

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



If 174.0 kg of butane is mixed with 320.0 kg of  $\text{O}_2$ , the volume of water formed in litres is \_\_\_\_\_. (Nearest integer) [Given : (a) Molar mass of C, H, O are 12, 1, 16 g mol<sup>-1</sup> respectively, (b) Density of water = 1 g mL<sup>-1</sup>]

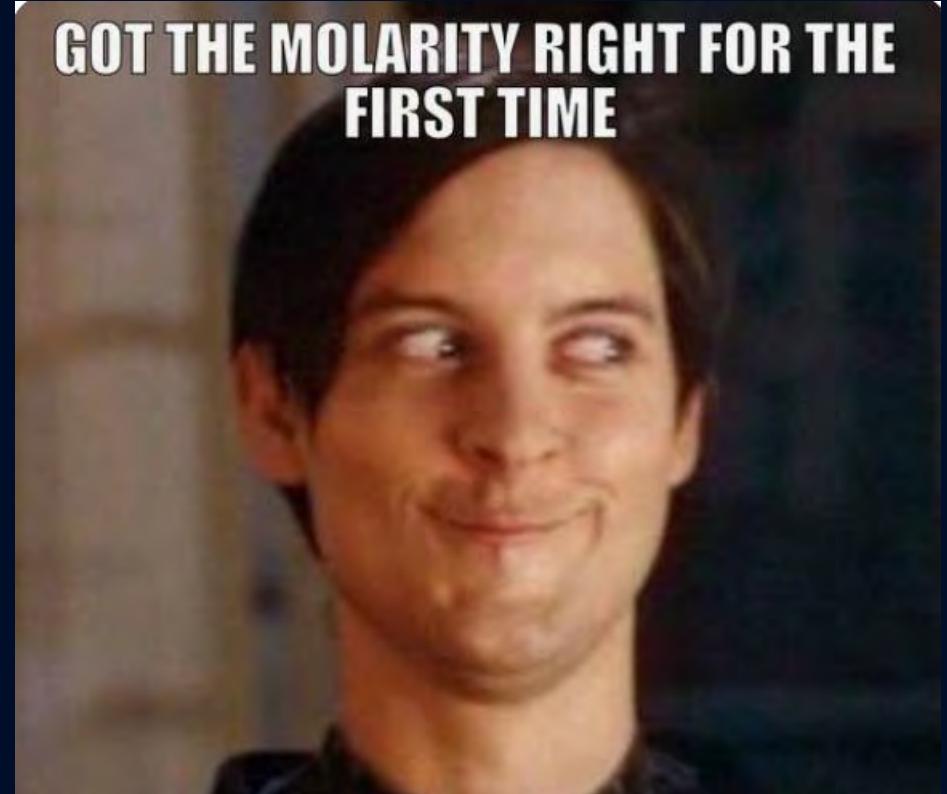
**Question (NV, JEE Main Feb. 01, 2024 (II))**

**10 mL of gaseous hydrocarbon on combustion gives 40 mL of  $\text{CO}_2(\text{g})$  and 50 mL of water vapour. Total number of carbon and hydrogen atoms in the hydrocarbon is \_\_\_\_\_.**

## 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.**

**GOT THE MOLARITY RIGHT FOR THE  
FIRST TIME**



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

**Volume of 3 M NaOH (formula weight 40 g mol<sup>-1</sup>) which can be prepared from 84 g of NaOH is \_\_\_\_\_ × 10<sup>-1</sup> dm<sup>3</sup>.**

**QUESTION (NEET PYQ )**

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

- A** 0.001 M
- B** 0.01 M
- C** 0.02 M
- D** 0.1 M

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

## Question



**How many grams of NaOH should be dissolved to make 100 cm<sup>3</sup> of 0.15 M NaOH solution? If gram formula mass of NaOH is 40 g.**

## Question



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

## Question



The molality of a urea solution in which 0.0100 g of urea,  $[(\text{NH}_2)_2\text{CO}]$  is added to 0.3000 dm<sup>3</sup> of water at STP is

- A  $5.55 \times 10^{-4}$  M
- B 33.3 M
- C  $3.33 \times 10^{-2}$  M
- D 0.555 M

**QUESTION (JEE 1986)**

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

- 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

## Question



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

8 g of NaOH is dissolved in 18 g of H<sub>2</sub>O. Mole fraction of NaOH in solution and molality (in mol kg<sup>-1</sup>) 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

**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

**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



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

## Question

A 5.2 molal aqueous solution of methyl alcohol,  $\text{CH}_3\text{OH}$ , 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

## Question

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

**1**  $13.88 \times 10^{-2}$

**2**  $13.88 \times 10^{-1}$

**3** 13.88

**4**  $13.88 \times 10^{-3}$

## 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  $\text{HNO}_3$  in a sample which has density 1.4 g/mL and mass percentage of 63% is \_\_\_\_\_. (Molecular Weight of  $\text{HNO}_3$  = 63)

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, 31<sup>st</sup> Aug 1<sup>st</sup> Shift)**

The molarity of the solution prepared by dissolving 6.3 g of oxalic acid ( $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ ) in 250 mL of water in  $\text{mol L}^{-1}$  is  $x \times 10^{-2}$ . The value of  $x$  is \_\_\_\_\_. (Nearest integer) [Atomic mass: H : 1.0, C : 12.0, O : 16.0]

## Question



If in an aqueous solution  $X_B = 0.3$  and moles of water is 21 in 3L, find molarity?

**Question**

An aqueous solution of ethanol ( $C_2H_5OH$ ) has density 1.025 g/mL and it is 2 M. What is the molality of this solution?

(Molar mass of ethanol = 46 g)

- 1** 1.79
- 2** 2.143
- 3** 1.951
- 4** None of these

**Question**

**Molarity and molality of a solution of a liquid (mol. mass = 50) in aqueous solution is 9 and 10 respectively. What is the density of solution?**

**1** 1 g/cc

**2** 0.95 g/cc

**3** 1.05 g/cc

**4** 1.35 g/cc

## Question



**Find volume of 6 M HCl which is required to prepare 500 mL of 3 M HCl?**

**Question**

**29.2% (w/w) HCl stock solution has a density of  $1.25 \text{ g mL}^{-1}$ . The molecular weight of HCl is  $36.5 \text{ g mol}^{-1}$ . The volume (mL) of stock solution required to prepare a 200 mL solution of 0.4 M HCl is**

**Question**

If 15 ppm of  $\text{CaCO}_3$  is present in 1 kg of water solution.

Find mass of  $\text{CaCO}_3$  in g.

## Question



What is molarity of K<sup>+</sup> in aqueous solution that contains 17.4 ppm of K<sub>2</sub>SO<sub>4</sub> (174 g mol<sup>-1</sup>)?

- 1**  $2 \times 10^{-2}$  M
- 2**  $2 \times 10^{-3}$  M
- 3**  $4 \times 10^{-4}$  M
- 4**  $2 \times 10^{-4}$  M

**Question (NCERT: PL-23 | JEE Main Jan. 22, 2025 (II))**

20 mL of 2 M NaOH solution is added to 400 mL of 0.5 M NaOH solution. The final concentration of the solution is \_\_\_\_\_  $\times 10^{-2}$  M. (Nearest integer)

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

**Chlorophyll extracted from the crushed green leaves was dissolved in water to make 2 L solution of Mg of concentration 48 ppm. The number of atoms of Mg in this solution is  $x \times 10^{20}$  atoms. The value of x is \_\_\_\_\_. (Nearest Integer)**  
**(Given : Atomic mass of Mg is 24 g mol<sup>-1</sup>;  $N_A = 6.02 \times 10^{23}$  mol<sup>-1</sup>)**

Dissolving 120 g of a compound of mol. wt. 60 in 1000 g of water gave a solution of density 1.12 g/mL. The molarity of the solution is :

A 1.00 M

B 2.00 M

C 2.50 M

D 4.00 M

**Question (NCERT: PL-20 | JEE Main April 02, 2025 (I))**

Consider the above reaction, what mass of  $\text{CaCl}_2$  will be formed if 250 mL of 0.76 M HCl reacts with 1000 g of  $\text{CaCO}_3$ ?

(Given : Molar mass of Ca, C, O, H and Cl are 40, 12, 16, 1 and 35.5 g mol<sup>-1</sup>, respectively)

A 3.908 g

B 2.636 g

C 10.545 g

D 5.272 g

**Question (NCERT: PL-23 | JEE Main Jan. 28, 2025 (II))**

Concentrated nitric acid is labelled as 75% by mass. The volume in mL of the solution which contains 30 g of nitric acid is \_\_\_\_\_.

Given : Density of nitric acid solution is 1.25 g/mL

A 45

B 55

C 32

D 40

**Question (NCERT: PL-20 | NV, JEE Main Jan. 28, 2025 (I))**

The molarity of a 70% (mass/mass) aqueous solution of a monobasic acid (X) is \_\_\_\_\_  $\times 10^{-1}$  M (Nearest integer)

[Given : Density of aqueous solution of (X) is 1.25 g mL<sup>-1</sup> Molar mass of the acid is 70 g mol<sup>-1</sup>]

Density of 3 M NaCl solution is 1.25 g/mL. The molality of the solution is :

- A 1.79 m
- B 2 m
- C 3 m
- D 2.79 m

**QUESTION [ JEE MAINS 9 Apr. 2019 (Shift-II)]**

**What would be the molality of 20% (mass/mass) aqueous solution of KI?  
(molar mass of KI = 166 g mol<sup>-1</sup>)**

- 1** 1.51
- 2** 1.08
- 3** 1.48
- 4** 1.35

**QUESTION – (AIIMS 2019)**

The empirical formula of the compound if M = 68% (atomic mass = 34) and remaining 32% oxygen is?



**QUESTION – (AIIMS 2019)**

Which one of the following is the lightest?

**A** 0.2 mole of hydrogen gas

**B**  $6.023 \times 10^{22}$  molecules of nitrogen

**C** 0.1 g of silver

**D** 0.1 mole of oxygen gas

**QUESTION – (AIIMS 2017)**

**Assertion:** Equal moles of different substances contain same number of constituent particles.

**Reason:** Equal weights of different substance contain the same number of constituent particles

- A** If both Assertion and Reason are correct and the Reason is the correct explanation of Assertion.
- B** If both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
- C** If Assertion is correct but Reason is incorrect.
- D** If both the Assertion and Reason are incorrect.

**QUESTION – (AIIMS 2018, 2013, 2011)**

**Assertion:** The normality of 0.3 M aqueous solution of  $\text{H}_3\text{PO}_3$  is equal to 0.6 N.

**Reason:** Equivalent weight of  $\text{H}_3\text{PO}_3 = \frac{\text{Molecular weight of H}_3\text{PO}_3}{3}$

- A** If both Assertion and Reason are correct and the Reason is the correct explanation of Assertion.
- B** If both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
- C** If Assertion is correct but Reason is incorrect.
- D** If both the Assertion and Reason are incorrect.

**QUESTION – (AIIMS 2018 (E), 26 May)**

A binary mixture of bivalent metals having mass 2 g, molecular mass of A and B are 15 and 30 respectively, is dissolved in HCl, it evolves 2.24 L  $\text{H}_2$  at STP, what is the mass of A present in mixture?

**A** 1 g

**B** 1.5 g

**C** 0.5 g

**D** 0.75 g

**QUESTION – (AIIMS 2017)**

Volume of water needed to mix with 10 mL 10 N  $\text{HNO}_3$  to get 0.1 N  $\text{HNO}_3$  is:

**A** 1000 mL

**B** 990 mL

**C** 1010 mL

**D** 10 mL

**QUESTION – (AIIMS 2016)**

Arrange the following in the order of increasing mass (atomic mass : O = 16, Cu = 63, N = 14)

- I. one atom of oxygen                            II. one atom of nitrogen  
III.  $1 \times 10^{-10}$  mole of oxygen               IV.  $1 \times 10^{-10}$  mole of copper

**A** II < I < III < IV

**B** I < II < III < IV

**C** III < II < IV < I

**D** IV < II < III < I

**QUESTION – (AIIMS 2014)**

Which has the maximum number of molecules among the following



**QUESTION – (AIIMS 2013)**

KMnO<sub>4</sub> reacts with oxalic acid according to the equation:



Here 20 mL of 0.1 M KMnO<sub>4</sub> is equivalent to:

- A** 20 mL of 0.5 M H<sub>2</sub>C<sub>2</sub>O<sub>4</sub>
- B** 50 mL of 0.5 M H<sub>2</sub>C<sub>2</sub>O<sub>4</sub>
- C** 50 mL of 0.1 M H<sub>2</sub>C<sub>2</sub>O<sub>4</sub>
- D** 20 mL of 0.1 M H<sub>2</sub>C<sub>2</sub>O<sub>4</sub>

**QUESTION – (AIIMS 2013)**

An aqueous solution of 6.3 g of oxalic acid dihydrate is made up to 250 mL. The volume of 0.1 N NaOH required to completely neutralize 10 mL of this solution is:

- A** 20 mL
- B** 40 mL
- C** 10 mL
- D** 4 mL

**QUESTION – (AIIMS 2012)**

In a hydrocarbon, mass ratio of hydrogen and carbon is 1 : 3, the empirical formula of hydrocarbon is:



**QUESTION – (AIIMS 2012)**

For preparing 0.1 N solution of a compound from its impure sample of which the percentage purity is known, the weight of the substance required will be

- A** less than the theoretical weight
- B** more than the theoretical weight
- C** same as the theoretical weight
- D** none of these

**QUESTION – (AIIMS 2010)**

A solution is prepared by dissolving 24.5 g of sodium hydroxide in distilled water to give 1 L solution. The molarity of NaOH in the solution is:

- A** 0.2450 M
- B** 0.6125 M
- C** 0.9800 M
- D** 1.6326 M

(Give that molar mass of NaOH = 40.0 g mol<sup>-1</sup>)

**QUESTION – (AIIMS 2010)**

The reaction of calcium with water is represented by the equation:



What volume of  $\text{H}_2$  at STP would be liberated when 8 g of calcium completely reacts with water?

**A**  $0.2 \text{ cm}^3$

**B**  $0.4 \text{ cm}^3$

**C**  $2240 \text{ cm}^3$

**D**  $4480 \text{ cm}^3$

**QUESTION – (AIIMS 2008)**

**Assertion:** One molal aqueous solution of glucose contains 180 g of glucose in 1 kg water.

**Reason:** Solution containing one mole of solute in 1000 g of solvent is called one molal solution.

- A** If both Assertion and Reason are correct and the Reason is the correct explanation of Assertion.
- B** If both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
- C** If Assertion is correct but Reason is incorrect.
- D** If both the Assertion and Reason are incorrect.

**QUESTION – (AIIMS 2008)**

**Assertion:** Equivalent weight of a base =  $\frac{\text{Molecular weight}}{\text{Acidity}}$

**Reason:** Acidity is the number of replaceable hydrogen atoms in one molecule of the base.

- A** If both Assertion and Reason are correct and the Reason is the correct explanation of Assertion.
- B** If both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
- C** If Assertion is correct but Reason is incorrect.
- D** If both the Assertion and Reason are incorrect.

**QUESTION – (AIIMS 2008)**

During electrolysis of water the volume of  $O_2$  liberated is  $2.24\text{ dm}^3$ . The volume of hydrogen liberated, under same conditions will be

- A**  $2.24\text{ dm}^3$
- B**  $1.12\text{ dm}^3$
- C**  $4.48\text{ dm}^3$
- D**  $0.56\text{ dm}^3$

**QUESTION – (AIIMS 2002)**

**Assertion:** Atoms can neither be created nor destroyed.

**Reason:** Under similar condition of temperature and pressure, equal volume of gases does not contain equal number of atoms.

- A** If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
- B** If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
- C** If the Assertion is correct but Reason is incorrect
- D** If both the Assertion and Reason are incorrect.
- E** If the Assertion is incorrect but the Reason is correct.

**QUESTION – (AIIMS 2002)**

The weight of one molecule of a compound of molecular formula C<sub>60</sub>H<sub>122</sub> is:

- A**  $1.2 \times 10^{-20}$  g
- B**  $5.025 \times 10^{23}$  g
- C**  $1.4 \times 10^{-21}$  g
- D**  $6.023 \times 10^{-20}$  g

**QUESTION – (AIIMS 2015)**

Sulphur forms the chlorides  $S_2Cl_2$  and  $SCl_2$ . The equivalent mass of sulphur in  $SCl_2$  is:

**A** 8 g/mol

**B** 16 g/mol

**C** 64.8 g/mol

**D** 32 g/mol

**Find no. of gram equivalents in**

- 1** 192 g of  $\text{SO}_4^{2-}$
- 2** 65 g of  $\text{Al}^{3+}$
- 3** 106.5g of  $\text{Cl}^-$
- 4** 117 g of NaCl
- 5** 294 g of  $\text{H}_2\text{SO}_4$

## Question



**Find normality if 80g of NaOH dissolved in 500 ml of solution (eq. mass of NaOH = 40g)**

## Question



If 98 g of  $\text{H}_2\text{SO}_4$  is present in 250 ml of solution. Find normality (N) (Molar mass of  $\text{H}_2\text{SO}_4$  = 98g)

**Assertion: Molarity of a solution does not depend upon temperature whereas molality depends.**

**Reason: Molarity and molality both depend only on the number of moles of solute particles.**

- 1** If both assertion and reason are true and reason is the correct explanation of assertion.
- 2** If both assertion and reason are true and reason is not the correct explanation of assertion.
- 3** If assertion is true but reason is false.
- 4** If both assertion and reason are false

## QUESTION



If metal oxide has 60 % oxygen. Find equivalent mass of metal?

## QUESTION



If metal chloride has 29 % Metal. find equivalent mass of metal?

**QUESTION**

If 80 g of Calcium reacts with excess of oxygen. Find mass of CaO formed.

**QUESTION**

If 40 g of  $\text{CaCO}_3$  is treated with 40 g of HCl, which of the reactants will act as limiting reagent?

- 1**  $\text{CaCO}_3$
- 2** HCl
- 3** Both (A) and (B)
- 4** None of these

**Question (NCERT: PL-23 | NV, JEE Main Jan. 29, 2024 (II))**

If 50 mL of 0.5 M oxalic acid is required to neutralize 25 mL of NaOH solution, the amount of NaOH in 50 mL of given NaOH solution is \_\_\_\_\_ g.

**QUESTION**

The weight of AgCl precipitated when a solution containing 5.85 g of NaCl is added to a solution containing 3.4 g of AgNO<sub>3</sub> is:

- 1** 28 g
- 2** 9.25 g
- 3** 2.87 g
- 4** 58 g

**QUESTION**

Find M of H<sup>+</sup> in resulting mixture If 5 L of 2 M H<sub>2</sub>SO<sub>4</sub> is mixed with 10 L of 1 M NaOH?

**QUESTION**

**Find M of OH<sup>-</sup> in resulting solution If 2 L of 5 M NaOH is mixed with 2 L of 1 N H<sub>2</sub>SO<sub>4</sub>?**

**QUESTION**

**Find nature of resulting solution and also normality of resulting solution if 2 L of 1 M KOH is mixed with 1 L of 1M HCl.**

**QUESTION**

**Find M of mixture is 2 L of 1 M HCl is mixed with 4 L of 2 N  $\text{H}_2\text{SO}_4$ .**

**QUESTION**

**Find molarity of mixturs when 1 L of 2 M NaOH and 2 L of 1 M Sr(OH)<sub>2</sub> are mixed together.**

## QUESTION



(a) Find M of  $\text{Cl}^-$  if 1 L of 2 M NaCl is mixed with 2 L of 1 M  $\text{CaCl}_2$  ?

(b) Find M of  $\text{Na}^+$  ion in mixtures?

(c) Find M of  $\text{Ca}^{2+}$  in mixture?

Dissolving 120 g of urea (mol. wt. 60) in 1000 g of water gave a solution of density 1.15 g/mL. The molarity of the solution is \_\_\_\_\_.

- 1** 1.78 M
- 2** 2.00 M
- 3** 2.05 M
- 4** 2.22 M

The mole fraction of a solute in a solution is 0.1. At 298 K, molarity of this solution is the same as its molality. Density of this solution at 298 K is  $2.0 \text{ g cm}^{-3}$ . The ratio of the molecular weights of the solute and solvent,  $\left( \frac{\text{MW}_{\text{solute}}}{\text{MW}_{\text{solvent}}} \right)$ , is

**QUESTION**

The density of NaOH solution is  $1.2 \text{ g cm}^{-3}$ . The molality of this solution is \_\_\_\_\_ m. (Round off to the nearest integer)

[Use : Atomic masses : Na = 23.0 u, O = 16.0 u, H = 1.0 u. Density of  $\text{H}_2\text{O} = 1.0 \text{ g cm}^{-3}$ )  
[ JEE MAINS 27 July. 2021 (Shift-I)]

**QUESTION**

An aqueous solution of ethanol ( $C_2H_5OH$ ) has density 1.025 g/mL and it is 2 M. What is the molality of this solution?

(Molar mass of ethanol = 46 g)

- 1** 1.79
- 2** 2.143
- 3** 1.951
- 4** None of these

**QUESTION**

A solution of sugar is obtained by mixing 200 g of its 25% solution and 500 g of its 40% solution (both by mass). The mass percentage of the resulting sugar solution is \_\_\_\_\_. (Nearest integer) [ JEE MAINS 11 Apr. 2023 (Shift-I)]

**QUESTION**

The density of 3 M solution of NaCl is  $1.0 \text{ g mL}^{-1}$ . Molality of the solution is \_\_\_\_\_  $\times 10^{-2} \text{ m}$ . (Nearest integer).

Given : Molar mass of Na and Cl is 23 and  $35.5 \text{ gmol}^{-1}$  respectively.

[ JEE MAINS 1 Feb. 2023 (Shift-I) ]

**QUESTION**

If 80 g of copper sulphate  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  is dissolved in deionised water to make 5 L solution, the concentration of the copper sulphate solution is  $\underline{\quad} \times 10^{-3} \text{ mol L}^{-1}$ . The value of x is  $\underline{\quad}$ .

[Atomic masses: Cu: 63.54 u, S: 32 u, O:16 u, H: 1 u]

[ JEE MAINS 1 Sept. 2021 (Shift-II)]

**QUESTION**

An aqueous KCl solution of density  $1.20 \text{ g mL}^{-1}$  has a molality of  $3.30 \text{ mol kg}^{-1}$ .  
The molarity of the solution in  $\text{mol L}^{-1}$  is \_\_\_\_\_. [Molar mass of KCl = 74.5]

[ JEE MAINS 26 Aug. 2021 (Shift-I)]

**Question (NCERT: PL-20 | NV, JEE Main April 08, 2025 (II))**

20 mL of sodium iodide solution gave 4.74 g silver iodide when treated with excess of silver nitrate solution. The molarity of the sodium iodide solution is \_\_\_\_\_ M. (Nearest Integer value ) (Given : Na = 23, I = 127, Ag = 108, N = 14, O = 16 g mol<sup>-1</sup>)

## QUESTION

A Protein has 3.2 % of Sulphur what can be the molar mass of Protein ?

- 1** 2000
- 2** 2500
- 3** 1600
- 4** 4900

**Question (NCERT: PL-18 | JEE Main July 26, 2022 (II))**

Hemoglobin contains 0.34% of iron by mass. The number of Fe atoms is 3.3 g of hemoglobin is : (Given : Atomic mass of Fe is 56 u,  $N_A$  in  $6.022 \times 10^{23} \text{ mol}^{-1}$ )

- A**  $1.21 \times 10^5$
- B**  $12.0 \times 10^{16}$
- C**  $1.21 \times 10^{20}$
- D**  $3.4 \times 10^{22}$

## QUESTION

A 100 g sample of Haemoglobin on analysis was found to contain 0.34 % Fe by mass. If each haemoglobin molecule has four  $\text{Fe}^{2+}$  the molecular mass of haemoglobin is

- 1** 77099.9 g
- 2** 12735 g
- 3** 65882 g
- 4** 96359.9 g

The molar mass of a gas was found to be 36 g/mol. What will be its vapour density?

- A) 72
- B) 18
- C) 12
- D) 6

#### **6. Vapour density helps in determining:**

- A) Rate of reaction
- B) Atomic number
- C) Molecular mass of a gas
- D) Boiling point

A gas has a vapour density of 2. Which gas is it most likely to be?

- A) H<sub>2</sub>
- B) He
- C) O<sub>2</sub>
- D) N<sub>2</sub>

**5. A hydrocarbon has a vapour density of 13. What is likely its molecular formula?**

(Given empirical formula CH)

- A) CH
- B) C<sub>2</sub>H<sub>2</sub>
- C) C<sub>2</sub>H<sub>4</sub>
- D) C<sub>2</sub>H<sub>6</sub>

**4. Which of the following gases will have the highest vapour density?**

- A) H<sub>2</sub>
- B) CH<sub>4</sub>
- C) CO<sub>2</sub>
- D) O<sub>2</sub>

**2. The vapour density of oxygen (O<sub>2</sub>) is:**

- A) 8
- B) 16
- C) 32
- D) 64

**QUESTION**

**Density of water is  $1 \text{ g cm}^{-3}$  at 298 K. Express this value in SI unit.**

**QUESTION**

Convert  $1 \text{ m}^3 = \underline{\hspace{2cm}} \text{ L ?}$

## QUESTION



Convert 1 L = \_\_\_\_\_ dm<sup>3</sup> ?

## QUESTION



Convert 25°C into Kelvin?

## QUESTION



Convert 40°C into °F?

## QUESTION



**How many kilogram are contained in 1 µg ?**

**QUESTION**

Two students performed the same experiment separately and each one of them recorded two reading of mass which are given below. Correct reading of mass is 3.0 g. On the basis of given data, mark the correct option out of the following statements.

[NCERT Exemplar]

Student	Observation		Student	Observation	
	(i)	(ii)		(i)	(ii)
A	3.01	2.99	(B)	3.05	2.95

- 1** Results of both the students are neither accurate nor precise
- 2** Results of student A are both precise and accurate
- 3** Results of student B are neither precise nor accurate
- 4** Results of student B are both precise and accurate

**QUESTION**

**How many significant figures are there in the following:**

- (a) 0.0025 →
- (b) 208 →
- (c) 5005 →
- (d) 126000 →
- (e) 500.0 →
- (f) 2.0034 →

**QUESTION**

How many significant figures should be present in the answer of following calculation? [NCERT Exemplar]

$$\frac{2.5 \times 1.25 \times 3.5}{2.01}$$

- 1** 2
- 2** 3
- 3** 4
- 4** 1

## QUESTION



If the density of a solution is  $3.12 \text{ g mL}^{-1}$ , the mass of  $1.5 \text{ mL}$  solution in significant figures is  
[NCERT Exemplar]

**1** 4.7 g

**2**  $4680 \times 10^{-3} \text{ g}$

**3** 4.680 g

**4** 46.80 g

## QUESTION (NCERT Exemplar)

A measured temperature on Fahrenheit scale is 200 °F. What will this reading be on Celsius scale?

**A** 40 °C

**B** 94 °C

**C** 93.3 °C

**D** 30 °C

**QUESTION (NCERT Exemplar)**

What will be the molarity of a solution, which contains 5.85 g of NaCl(s) per 500 mL?

**A**  $4 \text{ mol L}^{-1}$

**B**  $20 \text{ mol L}^{-1}$

**C**  $0.2 \text{ mol L}^{-1}$

**D**  $2 \text{ mol L}^{-1}$

## QUESTION (NCERT Exemplar)

If 500 mL of a 5M solution is diluted to 1500 mL, what will be the molarity of the solution obtained?

A 1.5 M

B 1.66 M

C 0.017 M

D 1.59 M

## QUESTION (NCERT Exemplar)

The number of atoms present in one mole of an element is equal to Avogadro number. Which of the following element contains the greatest number of atoms?

A 4g He

B 46g Na

C 0.40g Ca

D 12g He

## QUESTION (NCERT Exemplar)

If the concentration of glucose ( $C_6H_{12}O_6$ ) in blood is  $0.9\text{ g L}^{-1}$ , what will be the molarity of glucose in blood?

A 5 M

B 50 M

C 0.005 M

D 0.5 M

## QUESTION (NCERT Exemplar)

What will be the molality of the solution containing 18.25 g of HCl gas in 500 g of water?

A 0.1 m

B 1 M

C 0.5 m

D 1 m

**QUESTION (NCERT Exemplar)**

One mole of any substance contains  $6.022 \times 10^{23}$  atoms/molecules. Number of molecules of  $\text{H}_2\text{SO}_4$  present in 100 mL of 0.02M  $\text{H}_2\text{SO}_4$  solution is \_\_\_\_.

- A**  $12.044 \times 10^{20}$  molecules
- B**  $6.022 \times 10^{23}$  molecules
- C**  $1 \times 10^{23}$  molecules
- D**  $12.044 \times 10^{23}$  molecules

## QUESTION (NCERT Exemplar)

What is the mass percent of carbon in carbon dioxide?

A 0.034 %

B 27.27 %

C 3.4 %

D 28.7 %

## QUESTION (NCERT Exemplar)

The empirical formula and molecular mass of a compound are  $\text{CH}_2\text{O}$  and 180 g respectively. What will be the molecular formula of the compound?



**QUESTION (NCERT Exemplar)**

If the density of a solution is  $3.12 \text{ g mL}^{-1}$ , the mass of  $1.5 \text{ mL}$  solution in significant figures is \_\_\_\_.

**A**  $4.7 \text{ g}$

**B**  $4680 \times 10^{-3} \text{ g}$

**C**  $4.680 \text{ g}$

**D**  $46.80 \text{ g}$

## QUESTION (NCERT Exemplar)

Which of the following statements about a compound is incorrect?

- A A molecule of a compound has atoms of different elements.
- B B A compound cannot be separated into its constituent elements by physical methods of separation.
- C C A compound retains the physical properties of its constituent elements.
- D D The ratio of atoms of different elements in a compound is fixed.

**QUESTION (NCERT Exemplar)**

Which of the following statements is correct about the reaction given below:



- A** Total mass of iron and oxygen in reactants = total mass of iron and oxygen in product therefore it follows law of conservation of mass.
- B** Total mass of reactants = total mass of product; therefore, law of multiple proportions is followed.
- C** Amount of  $\text{Fe}_2\text{O}_3$  can be increased by taking any one of the reactants (iron or oxygen) in excess.
- D** Amount of  $\text{Fe}_2\text{O}_3$  produced will decrease if the amount of any one of the reactants (iron or oxygen) is taken in excess.

**QUESTION (NCERT Exemplar)**

Which of the following reactions is not correct according to the law of conservation of mass.

**A****B****C****D**

**QUESTION (NCERT Exemplar)**

Which of the following statements indicates that law of multiple proportion is being followed.

- A** Sample of carbon dioxide taken from any source will always have carbon and oxygen in the ratio 1 : 2.
- B** Carbon forms two oxides namely  $\text{CO}_2$  and  $\text{CO}$ , where masses of oxygen which combine with fixed mass of carbon are in the simple ratio 2 : 1.
- C** When magnesium burns in oxygen, the amount of magnesium taken for the reaction is equal to the amount of magnesium in magnesium oxide formed.
- D** At constant temperature and pressure 200 mL of hydrogen will combine with 100 mL oxygen to produce 200 mL of water vapour.



## MULTIPLE CHOICE QUESTIONS

**QUESTION\* (NCERT Exemplar)**

One mole of oxygen gas at STP is equal to \_\_\_\_.

- A**  $6.022 \times 10^{23}$  molecules of oxygen
- B**  $6.022 \times 10^{23}$  atoms of oxygen
- C** 16 g of oxygen
- D** 32 g of oxygen

**QUESTION\* (NCERT Exemplar)**

Sulphuric acid reacts with sodium hydroxide as follows:



When 1L of 0.1M Sulphuric acid solution is allowed to react with 1L of 0.1M sodium hydroxide solution, the amount of sodium sulphate formed and its molarity in the solution obtained is:

- A**  $0.1 \text{ mol L}^{-1}$
- B** 7.10 g
- C**  $0.025 \text{ mol L}^{-1}$
- D** 3.55 g

**QUESTION\* (NCERT Exemplar)**

Which of the following pairs have the same number of atoms?

- A** 16 g of  $O_2(g)$  and 4 g of  $H_2(g)$
- B** 16 g of  $O_2$  and 44 g of  $CO_2$
- C** 28 g of  $N_2$  and 32 g of  $O_2$
- D** 12 g of  $C(s)$  and 23 g of  $Na(s)$

**QUESTION\* (NCERT Exemplar)**

Which of the following solutions have the same concentration?

- A** 20 g of NaOH in 200 mL of solution
- B** 0.5 mol of KCl in 200 mL of solution
- C** 40 g of NaOH in 100 mL of solution
- D** 20 g of KOH in 200 mL of solution

**QUESTION\* (NCERT Exemplar)**

16 g of oxygen has same number of molecules as in

- A** 16 g of CO
- B** 28 g of  $\text{N}_2$
- C** 14 g of  $\text{N}_2$
- D** 1.0 g of  $\text{H}_2$

**QUESTION\* (NCERT Exemplar)**

Which of the following terms are unitless?

- A** Molality
- B** Molarity
- C** Mole fraction
- D** Mass percent

## QUESTION\* (NCERT Exemplar)

One of the statements of Dalton's atomic theory is given below:

"Compounds are formed when atoms of different elements combine in a fixed ratio"

Which of the following laws is **not** related to this statement?

A Law of conservation of mass

B Law of definite proportions

C Law of multiple proportions

D Avogadro law



# MATRIX MATCH TYPE QUESTIONS

## QUESTION (NCERT Exemplar)

Match the following:

- |   |                                      |
|---|--------------------------------------|
| (i) 88 g of $\text{CO}_2$                                     | (a) 0.25 mol                         |
| (ii) $6.022 \times 10^{23}$ molecules of $\text{H}_2\text{O}$ | (b) 2 mol                            |
| (iii) 5.6 litres of $\text{O}_2$ at STP                       | (c) 1 mol                            |
| (iv) 96 g of $\text{O}_2$                                     | (d) $6.022 \times 10^{23}$ molecules |
| (v) 1 mol of any gas  | (e) 3 mol                            |

## QUESTION (NCERT Exemplar)

Match the following physical quantities with units

	<b>Physical quantity</b>		<b>Unit</b>
(i)	Molarity	(a)	$\text{g mL}^{-1}$
(ii)	Mole fraction	(b)	mol
(iii)	Mole	(c)	Pascal
(iv)	Molality	(d)	Unitless
(v)	Pressure	(e)	$\text{mol L}^{-1}$
(vi)	Luminous intensity	(f)	Candela
(vii)	Density	(g)	$\text{mol kg}^{-1}$
(viii)	Mass	(h)	$\text{Nm}^{-1}$
		(i)	kg



# ASSERTION AND REASON TYPE

## QUESTION (NCERT Exemplar)

**Assertion (A):** The empirical mass of ethene is half of its molecular mass.

**Reason (R):** The empirical formula represents the simplest whole number ratio of various atoms present in a compound.

- A** Both A and R are true and R is the correct explanation of A.
- B** A is true but R is false.
- C** A is false but R is true.
- D** Both A and R are false.

## QUESTION (NCERT Exemplar)

**Assertion (A):** One atomic mass unit is defined as one twelfth of the mass of one carbon-12 atom.

**Reason (R):** Carbon-12 isotope is the most abundant isotope of carbon and has been chosen as standard.

- A** Both A and R are true and R is the correct explanation of A.
- B** Both A and R are true but R is not the correct explanation of A.
- C** A is true but R is false.
- D** Both A and R are false.

## QUESTION (NCERT Exemplar)

**Assertion (A):** Significant figures for 0.200 is 3 where as for 200 it is 1.

**Reason (R):** Zero at the end or right of a number are significant provided they are not on the right side of the decimal point.

- A** Both A and R are true and R is correct explanation of A.
- B** Both A and R are true but R is not a correct explanation of A.
- C** A is true but R is false.
- D** Both A and R are false.

## QUESTION (NCERT Exemplar)

**Assertion (A):** Combustion of 16 g of methane gives 18 g of water.

**Reason (R):** In the combustion of methane, water is one of the products.

- A** Both A and R are true but R is not the correct explanation of A.
- B** A is true but R is false.
- C** A is false but R is true.
- D** Both A and R are false.

**THANK  
YOU**