SAMPLE CONTENT

MHT-CET

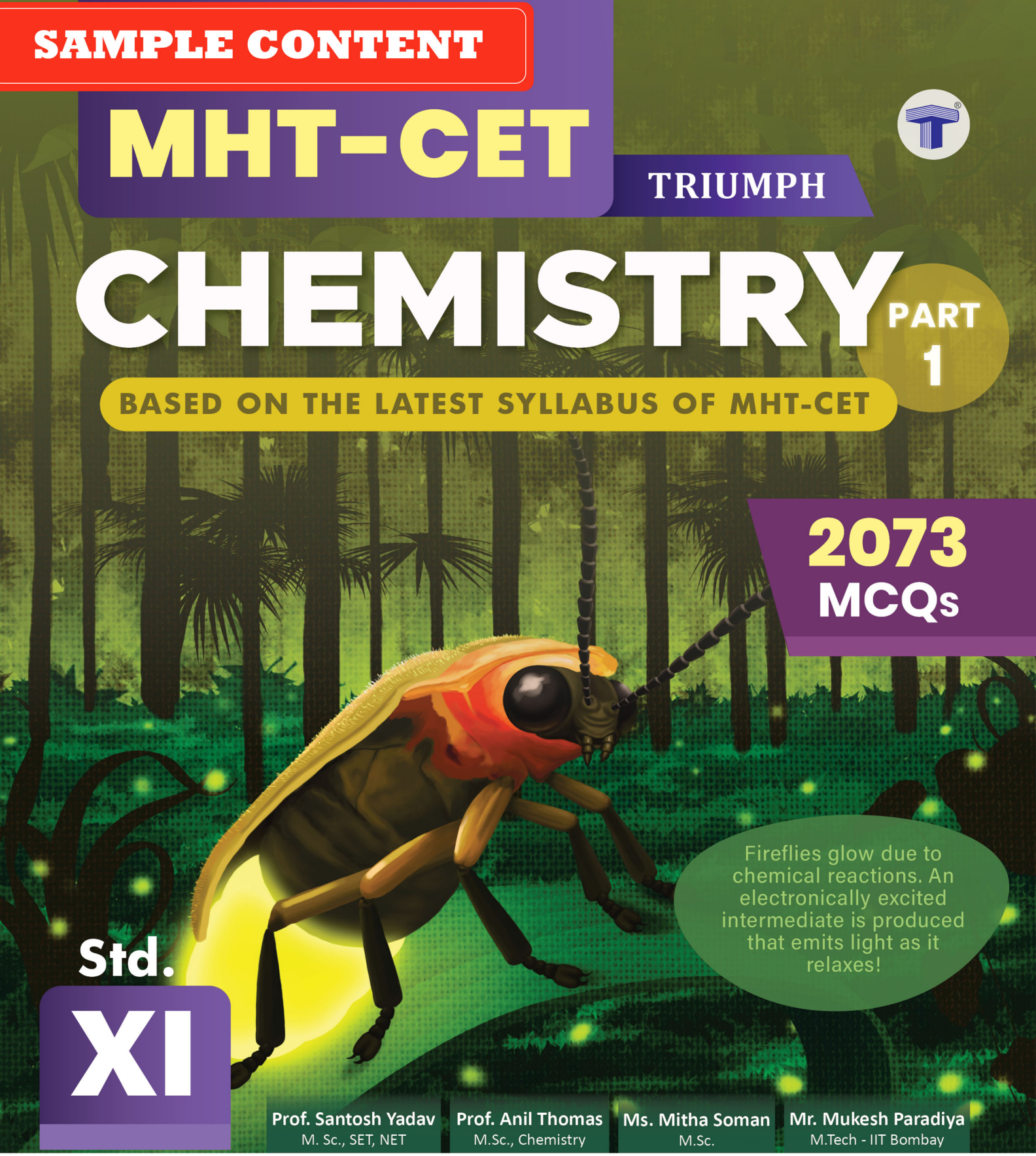
TRIUMPH

CHEMISTRY

PART 1

BASED ON THE LATEST SYLLABUS OF MHT-CET

2073 MCQs



Fireflies glow due to chemical reactions. An electronically excited intermediate is produced that emits light as it relaxes!

Std. XI

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Target Publications® Pvt. Ltd.

Written in accordance with the latest MHT-CET Paper Pattern prescribed by
State Common Entrance Test Cell, Maharashtra State

MHT-CET TRIUMPH

CHEMISTRY

2073 MCQs

Based on the latest Syllabus of MHT-CET

PART 1 Std. XI

Salient Features

- Includes relevant chapters of Std. XI as per the latest MHT-CET Syllabus
- Includes '2073' MCQs
- Quick Review and exhaustive subtopic wise coverage of MCQs
- Compilation of all 'Important Formulae' in relevant chapters
- Evaluation Test for each chapter
- Includes **Smart Keys** (Key Notes For Good Practice, Smart Code, Caution, Thinking Hatke, Shortcuts)
- 'Real-world applications' in each chapter
- Video/pdf links via QR codes for boosting conceptual retention
- Answer keys for all the chapters and Evaluation Tests at the end of book
- *Solutions to MCQs and Evaluation Test can be accessed through Q.R. code given at the end of each chapter*

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PREFACE

"Don't follow your dreams; chase them!" A quote by Richard Dumbrill is perhaps the most pertinent for one who is aiming to crack entrance examinations held after Std. XII. We are aware of the aggressive competition a student appearing for such career-defining examinations experiences and hence wanted to create books that develop the necessary knowledge, tools, and skills required to excel in these examinations.

For the syllabus of **MHT-CET**, 80% of the weightage is given to the syllabus for XIIth standard while only 20% is given to the syllabus for XIth standard (with inclusion of only selected topics).

We believe that although the syllabus for Std. XII and XI and MHT-CET is aligned, the outlook for studying the subject should be altered based on the nature of the examination. To score well in the MHT-CET, a student has to be not just good with the concepts but also quick to complete the test successfully. Such ingenuity can be developed through sincere learning and dedicated practice.

As a first step to MCQ solving, students should start with elementary questions. Once momentum is gained, complex MCQs with a higher level of difficulty should be practised. Such holistic preparation is the key to succeeding in the examination!

Target's **Triumph MHT-CET Chemistry Standard XI** book which covers relevant chapters of Std. XI has been designed to achieve the above objectives. Beginning with basic MCQs, the book proceeds to develop competence to solve complex MCQs. It offers ample practice of recent questions from MHT-CET examinations. It also includes solutions (via QR codes) that provide explanations to help students learn how to solve the MCQs.

The sections of **Key Notes For Good Practice, Quick Review, Formulae,** and **MCQs (Classical, Critical, Concept Fusion, Previous Years' MHT-CET Questions, Evaluation Test)** form the backbone of every chapter and ensure adequate revision.

All the features of this book pave the way for a student to excel in the examination. The features are designed keeping the following elements in mind: Time management, easy memorization or revision, and non-conventional yet simple methods for MCQ solving. The features of the book presented on the next page will explain more about them!

We hope the book benefits the learner as we have envisioned.

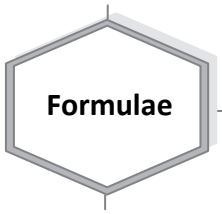
Publisher
Edition: Second

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

Please write to us on: mail@targetpublications.org

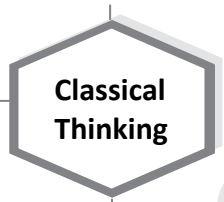
FEATURES

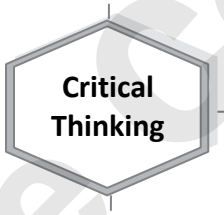
Quick Review includes tables/charts to summarize the key points/important chemical reactions in the chapter.
This is our attempt to help students to reinforce key concepts.



Formulae includes all of the key formulae in the chapter.
This is our attempt to make tools of formulae accessible for students while solving problems and revising at last minute at a glance.

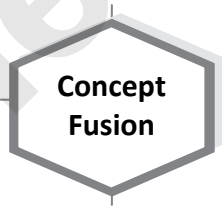
Classical Thinking section encompasses straight forward questions including knowledge based questions.
This is our attempt to revise chapter in its basic form and warm up students to deal with complex MCQs.

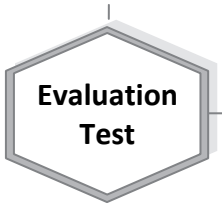




Critical Thinking section encompasses challenging questions which test understanding, rational thinking and application skills of students.
This is our attempt to take students from beginner to proficient level in smooth steps.

Concept Questions Fusion section encompasses questions whose solutions require knowledge of concepts covered in different sub-topics of same chapter or from different chapters.
This is our attempt to develop cognitive thinking in the students essential to solve questions involving fusion of multiple key concepts.

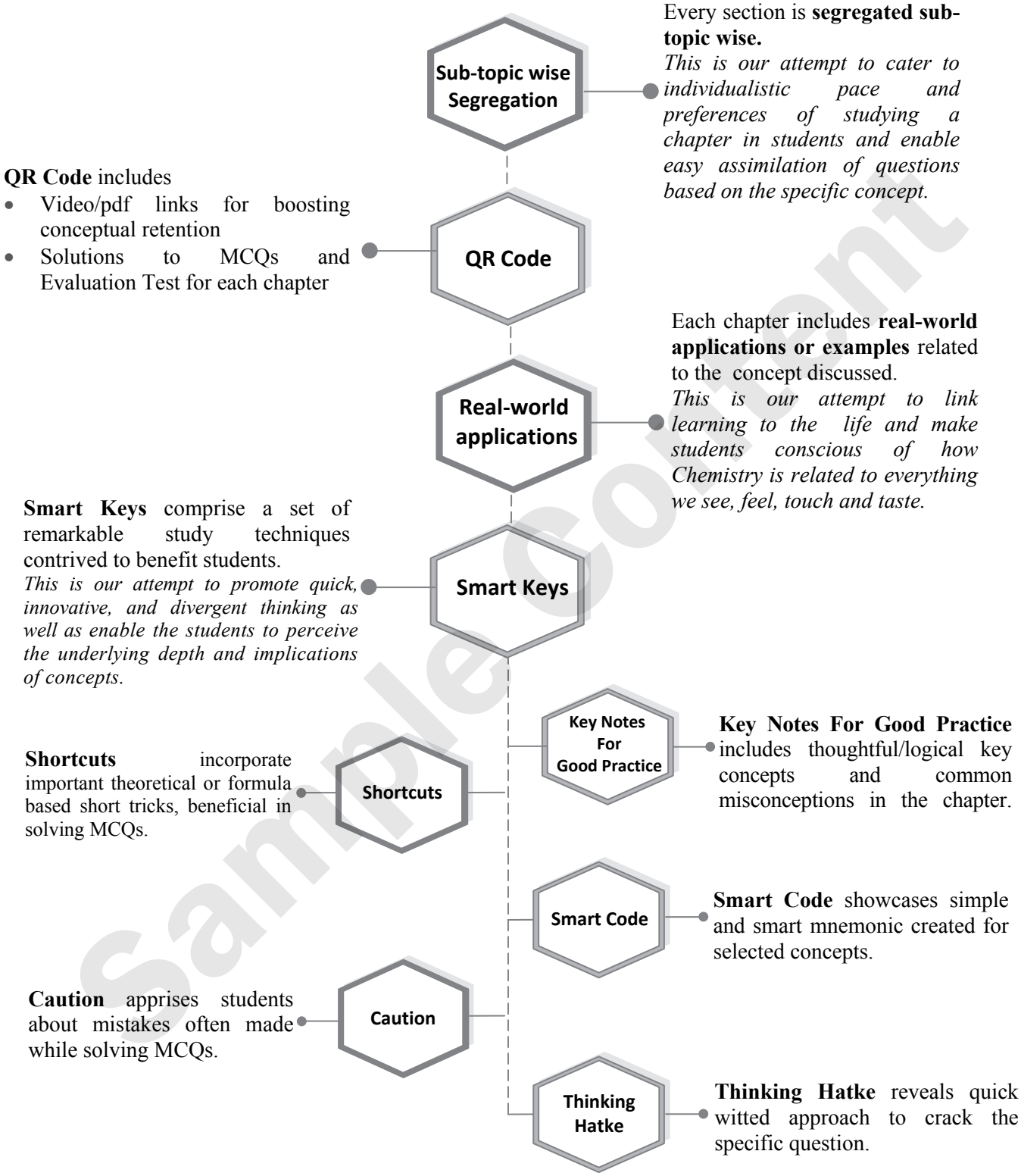




Evaluation Test encompasses questions based on concepts covered in the entire chapter.
This is our attempt to allow self-assessment of the chapter

Continued…

FEATURES



MHT-CET PAPER PATTERN

- There will be three papers of Multiple Choice Questions (MCQs) in 'Mathematics', 'Physics and Chemistry' and 'Biology' of 100 marks each.
- Duration of each paper will be 90 minutes.
- Questions will be based on the syllabus prescribed by Maharashtra State Board of Secondary and Higher Secondary Education with approximately 20% weightage given to Std. XI and 80% weightage will be given to Std. XII curriculum.
- Difficulty level of questions will be at par with JEE (Main) for Mathematics, Physics, Chemistry and at par with NEET for Biology.
- There will be no negative marking.
- Questions will be mainly application based.
- Details of the papers are as given below:

Paper	Subject	Approximate No. of Multiple Choice Questions (MCQs) based on		Mark(s) Per Question	Total Marks
		Std. XI	Std. XII		
Paper I	Mathematics	10	40	2	100
Paper II	Physics	10	40	1	100
	Chemistry	10	40		
Paper III	Biology	20	80	1	100

- Questions will be set on
  i. the entire syllabus of Std. XII of Physics, Chemistry, Mathematics and Biology subjects prescribed by Maharashtra Bureau of Textbook Production and curriculum Research, Pune, and
  ii. chapters / units from Std. XI curriculum as mentioned below:

Sr. No.	Subject	Chapters / Units of Std. XI
1	Physics	Motion in a plane, Laws of motion, Gravitation, Thermal properties of matter, Sound, Optics, Electrostatics, Semiconductors
2	Chemistry	Some Basic Concepts of Chemistry, Structure of Atom, Chemical Bonding, Redox Reactions, Elements of Group 1 and Group 2, States of Matter: Gaseous and Liquid States, Basic Principles of Organic Chemistry, Adsorption and Colloids, Hydrocarbons
3	Mathematics	Trigonometry - II, Straight Line, Circle, Measures of Dispersion, Probability, Complex Numbers, Permutations and Combinations, Functions, Limits, Continuity
4	Biology	Biomolecules, Respiration and Energy Transfer, Human Nutrition, Excretion and osmoregulation

CONTENTS

Chapter

1

Some Basic Concepts of Chemistry

Elemental analysis to catch elephant poachers!!

Due to illegal poaching, the elephant population in Africa is dwindling. The relative amounts of $^{12}C/^{13}C$, $^{14}N/^{15}N$ and $^{86}Sr/^{87}Sr$ in elephant tusk/ivory vary based on the geographical locations of elephants. Elemental analysis of ivory trinkets and elephant tusks using mass spectrometer can help identify the region of Africa where the elephant lived. Thus, the origin of illegal trade can be traced and prevented.

Chapter Outline

Key Notes For Good Practice

- *Mass is a measure of the quantity of matter and is independent of location. Weight is the force exerted by an object and it depends on the gravity. Same object has a different weight on the Earth and the Moon, but the same mass.*
- *It is always good to write units at each stage of calculation, and expressing numerical quantities in same system of units for easy cancellation of units or conversion of units.*
- *Temperature and heat are different terms. Heat is a mode of transfer of energy while temperature is a property that determines the direction of transfer of heat.*
- *Note that 0 °C corresponds to 32 °F and 100 °C corresponds to 212 °F. So, every one degree rise in Celcius scale corresponds 9/5 dgree rise in Fahrenheit. Hence, we get equation, °F = 9/5°C + 32.*
- *Units can be repsented in two ways: For example, g/cm^3 or g cm^{-3}. Both are widely used.*
- *The law of definite composition is not true for all types of compounds. It is true for only those compounds which are obtained from one type of isotope.*
- *Always specify the identity of the substance while using 'mole' unit to avoid any ambiguity. i.e., 1 mole oxygen molecules and 1 mole oxygen atoms are not the same.*

Fundamental Constants in This Chapter	
Avogadro's Constant (N_A)	6.022×10^{23} particles
1 amu (u)	1.66056×10^{-24} g
Molar Volume (At STP), (V_m)	22.414 L

Quick Review

➢ Branches of chemistry:

Chemistry

Chemistry is the study of matter, its physical and chemical properties and the physical and chemical changes it undergoes under different conditions.

Physical chemistry

It deals with the study of properties of matter, the energy changes and the theories, laws and principles that explain the transformation of matter from one form to another.

Organic chemistry

It deals with properties and reactions of compounds of carbon.

Analytical chemistry

It deals with the separation, identification and quantitative determination of the compositions of different substances.

Inorganic chemistry

It deals with the study of all the compounds which are not organic.

Biochemistry

It deals with chemistry of compounds and processes occurring in living organisms.

➢ Classification of matter (On basis of chemical composition):

Matter
(Occupies space and has mass)

Pure substance
(Have a definite chemical composition)

Mixture
(Have no definite chemical composition and hence no definite properties)

Element
Cannot be broken down into simpler substances by ordinary chemical changes

Pure silver

Compound
Two or more elements combine in fixed proportion

Common salt

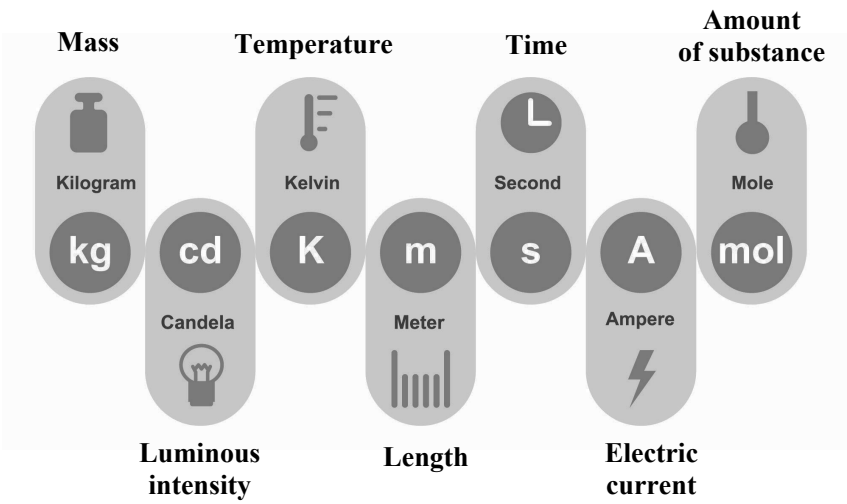
Homogeneous
Constituents are uniformly mixed throughout its bulk

Vinegar

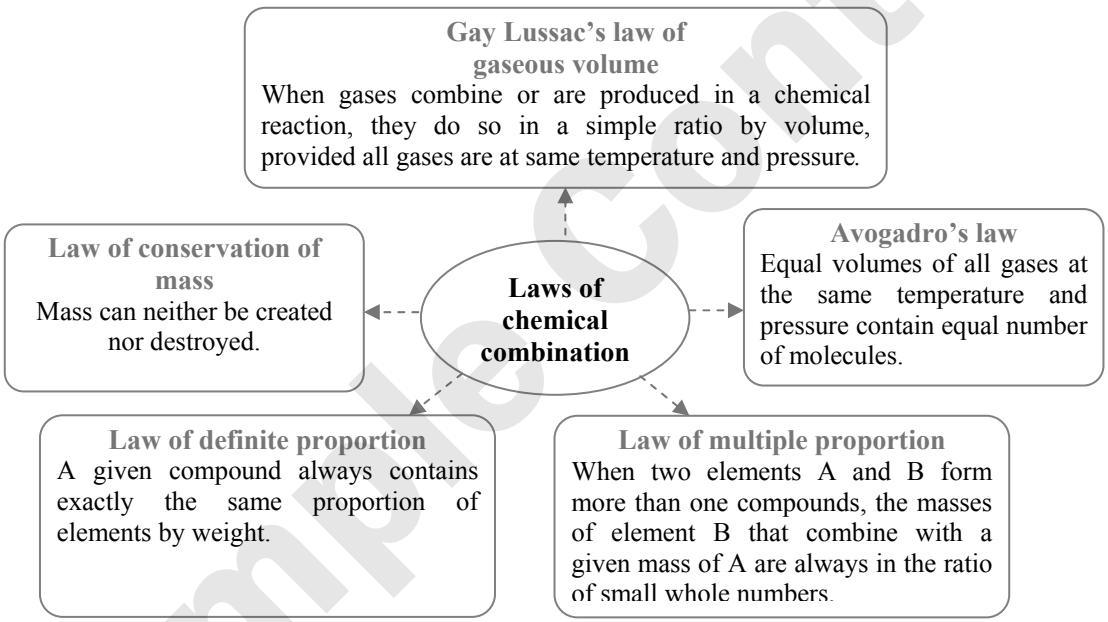
Heterogeneous
Constituents are not uniformly mixed throughout the bulk.

Tomato sauce

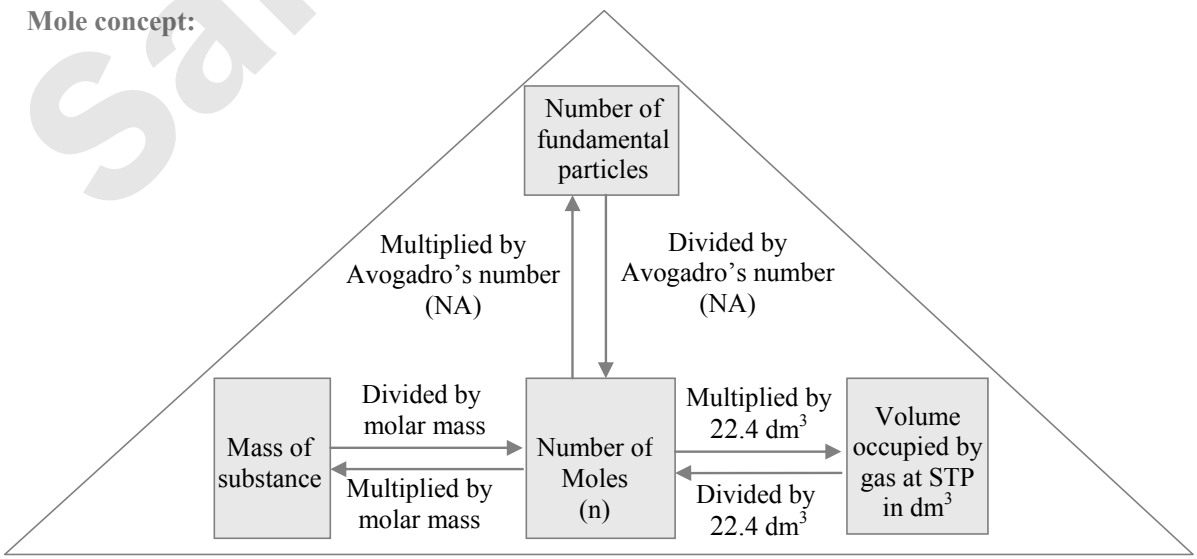
➢ **SI Fundamental units**



➢ **Laws of chemical combination:**



➢ **Mole concept:**



Formulae

1. Celsius to Fahrenheit

$$°F = \frac{9}{5}(°C) + 32$$

2. Celsius to Kelvin

$$K = °C + 273.15$$

3. Atomic mass unit (1 amu)

$$= \frac{1}{12}\text{th of a } {}^{12}\text{C-atom}$$

$$= 1.66 \times 10^{-27}\ \text{kg}$$

4. Average atomic mass

$$= \frac{\text{Sum of (Isotopic mass} \times \%\text{Abundance)}}{100}$$

5. Number of moles

$$n = \frac{\text{Mass of a substance}}{\text{Molar mass of a substance}}$$

6. Number of molecules

= Number of moles × Avogadro number

= Number of moles × 6.022×10^{23}

7. Molar volume of a gas at STP

$V = 22.4\ dm^3\ mol^{-1}$

8. Number of moles

$$n = \frac{\text{Volume of a gas at STP}}{\text{Molar volume of a gas}} = \frac{\text{Volume of a gas at STP}}{22.4\ dm^3\ mol^{-1}}$$

Classical Thinking

1.1 Introduction

1. Which of the following statements is INCORRECT?
   (A) Technological development in sophisticated instruments has expanded our knowledge of chemistry.
   (B) Knowledge of chemistry is required in the studies of physics, biological sciences, applied sciences, and earth and space sciences.
   (C) Chemistry does not involve the study of physical properties of matter.
   (D) The scope of chemistry is in every aspect of life.

1.2 Nature of chemistry

1. The branch of chemistry that deals with the chemistry of elements other than carbon is called _____.
   (A) Physical (B) Physical
   (C) Inorganic (D) Organic
2. The branch of chemistry, which deals with the studies of properties of matter is called _____ chemistry.
   (A) organic (B) inorganic
   (C) physical (D) bio
3. Which of the following statements is INCORRECT for elements?
   (A) They are pure substances.
   (B) They cannot be broken down into simpler substances by ordinary chemical changes.
   (C) Two or three elements are combined in a fixed proportion to form element.
   (D) Graphite is an element.
4. Following are compounds except _____.
   (A) water (B) mercuric oxide
   (C) Table salt (D) arsenic
5. Identify mixture among the following.
   (A) Gold coin (B) Distilled water
   (C) Germanium (D) Paint
6. Which one of the following is NOT a mixture?
   (A) concrete (B) Gasoline
   (C) A rusty nail (D) Silicon

1.3 Properties of matter and their measurement

1. Which of the following statements is INCORRECT?
   (A) Any quantitative measurement is expressed by a number followed by units.
   (B) The SI system has six base units.
   (C) The arbitrarily decided and universally accepted standards are called units.
   (D) The standard quantity is reproducible and unchanging.
2. Which of the following is NOT CGS unit?
   (A) Centimetre (B) Pound
   (C) Gram (D) Second
3. Which of the following is NOT FPS unit?
   (A) Second (B) Pound
   (C) Foot (D) Kilogram

4. One picometre is equal to _____.
(A) 10^{-12} m (B) 10^{-15} m
(C) 10^{12} m (D) 10^{-9} m

5. CGS unit of density is _____.
(A) g m^{-3} (B) g cm^{-3}
(C) g L^{-1} (D) g mL^{-1}

6. Which is NOT a scale of temperature measurement?
(A) Candela (Cd)
(B) Degree Celsius (°C)
(C) Degree Fahrenheit (°F)
(D) Kelvin (K)

7. The relationship between degree Fahrenheit and degree Celsius is expressed as _____.
(A) $°F = \frac{5}{9}$ (°C) + 32
(B) $°F = \frac{9}{5}$ (°C) + 32
(C) °F = °C + 273.15
(D) °F = °C + 32

1.4 Laws of chemical combination

1. According to the law of conservation of mass, _____.
(A) mass can be created but cannot be destroyed
(B) mass cannot be created but can be destroyed
(C) mass can neither be created nor destroyed
(D) mass can be created and destroyed

2. The sum of the masses of reactants and products is equal in any physical or chemical reaction. This is in accordance with law of _____.
(A) multiple proportion
(B) definite composition
(C) conservation of mass
(D) reciprocal proportion

3. If the law of conservation of mass was to hold true, then 20.8 g of $BaCl_2$, on reaction with 9.8 g of H_2SO_4 will produce 7.3 g of HCl and _____ of $BaSO_4$.
(A) 11.65 g (B) 23.3 g
(C) 25.5 g (D) 30.6 g

4. Pure water can be obtained from various sources, but it always contains hydrogen and oxygen, combined in a ratio of 1:8 by weight. This is an example of _____.
(A) law of conservation of mass
(B) Avogadro's law
(C) law of definite composition
(D) Gay Lussac's law

5. A sample of pure carbon dioxide, irrespective of its source contains 27.27% carbon and 72.73% oxygen. The data supports _____.
(A) law of definite composition
(B) law of conservation of mass
(C) law of reciprocal proportions
(D) law of multiple proportions

6. In SO_2 and SO_3, the ratio of the masses of oxygen that combine with a fixed mass of sulphur is 2:3. This is an example of the law of _____.
(A) constant proportion
(B) multiple proportion
(C) reciprocal proportion
(D) conservation of mass

7. Two containers of the same size are filled separately with H_2 gas and CO_2 gas. Both the containers under the same T and P will contain the same _____.
(A) number of atoms
(B) weight of gas
(C) number of molecules
(D) number of electrons

8. Which of the following reactions has the ratio of volumes of reacting gases and the product as 1:2:2 (at same temperature and pressure)?
(A) $2CO_{(g)} + O_{2(g)} \longrightarrow 2CO_{2(g)}$
(B) $O_{2(g)} + 2H_{2(g)} \longrightarrow 2H_2O_{(g)}$
(C) $H_{2(g)} + F_{2(g)} \longrightarrow 2HF_{(g)}$
(D) $N_{2(g)} + 3H_{2(g)} \longrightarrow 2NH_{3(g)}$

1.5 Avogadro law

1. Which of the following law states that equal volumes of all gases under identical conditions of temperature and pressure contain equal number of molecules?
(A) Boyle's law
(B) Charles' law
(C) Avogadro's law
(D) Gay Lussac's law

1.6 Dalton's atomic theory

1. Dalton assumed that _____ are the tiny, indivisible particles.
(A) atoms (B) molecules
(C) ions (D) elements

1.7 Atomic and molecular masses

1. 1 amu is equal to _____.
(A) $\frac{1}{12}$ of mass of one C-12
(B) $\frac{1}{14}$ of mass of one O-16
(C) 1 g of H_2
(D) 1.66×10^{-23} kg

2. Isotopes are the atoms of the same element having _____.
   (A) different atomic masses
   (B) same atomic masses
   (C) different number of electrons
   (D) different number of protons

3. _____ is the sum of average atomic masses of the atoms of the elements which constitute the molecule.
   (A) Molecular mass
   (B) Atomic weight
   (C) Percentage weight
   (D) Percentage volume

1.8 Mole concept and molar mass

1. 1 mole atoms = _____ atoms.
   (A) 6.021×10^{21} (B) 6.024×10^{24}
   (C) 6.051×10^{15} (D) 6.022×10^{23}

2. One _____ is the collection of 6.022×10^{23} atoms /molecules/ions.
   (A) kg (B) g
   (C) mole (D) cm

3. One mole of oxygen gas weighs _____.
   (A) 1 g (B) 8 g
   (C) 32 g (D) 6.022×10^{23} g

4. The molar mass of hydrogen peroxide is 34. What is the unit of molar mass?
   (A) g (B) mol
   (C) g mol^{-1} (D) mol g^{-1}

5. 1 mole of benzene is equal to _____ g C_6H_6.
   (A) 70 (B) 72
   (C) 10 (D) 78

6. How many molecules are present in one gram of hydrogen gas?
   (A) 6×10^{23} (B) 3×10^{23}
   (C) 2.5×10^{23} (D) 1.5×10^{23}

7. One mole of CO_2 contains _____.
   (A) 6.022×10^{23} atoms of C
   (B) 6.022×10^{23} atoms of O
   (C) 18.1×10^{23} molecules of CO_2
   (D) 3 atoms of CO_2

8. One mole of H_2O corresponds to _____.
   (A) 1 mole of hydrogen atoms
   (B) 6.022×10^{23} atoms of hydrogen and 6.022×10^{23} atoms of oxygen
   (C) 18 g of H_2O
   (D) 1 g of H_2O

9. 1 atom of an element weighs 1.792×10^{-22} g. The atomic mass of the element is _____.
   (A) 1.192 (B) 17.92
   (C) 64 (D) 108

10. What is the mass of 0.5 mole of ozone molecule?
    (A) 8 g (B) 16 g
    (C) 24 g (D) 48 g

11. The number of molecules in 16 g of oxygen gas is _____.
    (A) 6.022×10^{23} (B) 3.011×10^{23}
    (C) 3.011×10^{22} (D) 1.5×10^{23}

1.9 Moles and gases

1. One mole of any gas occupies a volume of 22.4 dm^3 at _____.
   (A) standard temperature (0 °C) and pressure (1 atm)
   (B) standard temperature (298 K) and pressure (1 atm)
   (C) standard temperature (100 °C) and pressure (10 atm)
   (D) standard temperature (273 K) and pressure (10 atm)

2. The number of S atoms in 22.4 dm^3 of SO_2 gas at STP is _____.
   (A) 6.022×10^{20} (B) 6.022×10^{23}
   (C) 22.4×10^{20} (D) 22.4×10^{23}

Critical Thinking

1.2 Nature of chemistry

1. Identify the INCORRECT statement about metals.
   (A) They are brittle.
   (B) They can be hammered into thin sheets.
   (C) They cannot be drawn into wire.
   (D) They have a lustre.

2. Which of the following show(s) exceptions to general properties of nonmetals?
   (A) Diamond and iodine have lustre.
   (B) Graphite is good conductor of electricity.
   (C) Diamond is the hardest known substance.
   (D) All of these

3. Identify INCORRECT statement.
   (A) Pure substances have a definite chemical composition.
   (B) Composition of a mixture can be varied to any extent.
   (C) Water and table salt are examples of a compound.
   (D) The constituents of a compound can be easily separated by physical methods.

4. Which of the following statements is INCORRECT?
   (A) Constituent substances in a mixture retain their separate identities.
   (B) Suspension of an insoluble solid in a liquid is an example of heterogeneous mixture.
   (C) Mixture of any two liquids is an example of homogeneous mixtures.
   (D) Mixtures can be separated into pure components by simple physical methods.

5. Which of the following is INCORRECT match?
   (A) Homogeneous mixture: Solution (An aqueous solution of sugar)
   (B) Heterogeneous mixture: Suspension (of sand in water)
   (C) Element: Gold
   (D) Compound: A rusty nail

6. Which of the following is(are) CORRECT match(es)?
   (A) Solid: Particles are held tightly in perfect order.
   (B) Liquid: Particles are close to each other but can move around within the liquid.
   (C) Gas: Particles are far apart as compared to that of solid and liquid.
   (D) All of these

1.3 Properties of matter and their measurement

1. In 1960, the general conference of weights and measure, proposed revised metric system, called _____ units.
   (A) CGS (B) MKS
   (C) FPS (D) SI

2. The SI unit of volume is expressed as _____.
   (A) $(metre)^3$
   (B) $(centimetre)^3$
   (C) litre
   (D) millilitre

3. Which of the following relations for expressing volume of a sample is INCORRECT?
   (A) $1\ L = 10^3\ mL$
   (B) $1\ dm^3 = 1\ L$
   (C) $1\ L = 10^3\ m^3$
   (D) $1\ L = 10^3\ cm^3$

4. Identify the CORRECT statement.
   (A) The mass of a body varies as its position changes.
   (B) The SI unit of length is centimetre.
   (C) A burette is used to prepare a known volume of a solution.
   (D) The mass of a body is more fundamental property than its weight.

5. Convert 40 °C temperature to degree Fahrenheit.
   (A) 104 °F (B) 86 °F
   (C) 313 °F (D) 233 °F

6. Convert 50 °F temperature to degree Celsius.
   (A) 323 °C (B) 10 °C
   (C) 223 °C (D) –10 °C

1.4 Laws of chemical combination

1. Two samples of lead oxide were separately reduced to metallic lead by heating in a current of hydrogen. The weight of lead from one oxide was half the weight of lead obtained from the other oxide. The data illustrates _____.
   (A) law of reciprocal proportions
   (B) law of constant proportions
   (C) law of multiple proportions
   (D) law of equivalent proportions

2. Hydrogen and oxygen combine to form H_2O_2 and H_2O containing 5.93% and 11.29% of hydrogen respectively. The data illustrates _____.
   (A) law of conservation of mass
   (B) law of definite composition
   (C) law of reciprocal proportion
   (D) law of multiple proportion

3. Two elements, A and B, combine to form a compound in which 'a' g of A combines with 'b_1' and 'b_2' g of B respectively. According to law of multiple proportion, _____.
   (A) $b_1 = b_2$
   (B) b_1 and b_2 bear a simple whole number ratio
   (C) a is always equal to b_1
   (D) no relation exists between b_1 and b_2

4. The law of multiple proportions is illustrated by the compounds _____.
   (A) carbon monoxide and carbon dioxide
   (B) potassium bromide and potassium chloride
   (C) ordinary water and heavy water (D_2O)
   (D) calcium hydroxide and barium hydroxide

5. The mass of sulphur dioxide produced by burning 16 g of sulphur in excess of oxygen in contact process is _____ g.
   (Average atomic mass: S = 32 u, O = 16 u).
   (A) 16 (B) 32
   (C) 64 (D) 128

6. How many litres of ammonia will be formed when 2 L of N_2 and 2 L of H_2 are allowed to react?
   (A) 0.665 (B) 1.0
   (C) 1.33 (D) 4.00

1.6 Dalton's atomic theory

1. Which of the following statements is FALSE according to Dalton's atomic theory?
   (A) Chemical reactions involve only the reorganization of atoms.
   (B) Law of conservation of mass can be explained by assuming that total number of atoms in the reactants and products remain same.
   (C) During chemical reactions, atoms are neither created nor destroyed.
   (D) Atoms of the same element have different properties.

1.7 Atomic and molecular masses

1. Which of the following is the value of amu?
   (A) 1.57×10^{-24} kg (B) 1.66×10^{-24} kg
   (C) 1.99×10^{-23} kg (D) 1.66×10^{-27} kg

2. What will be the mass of one atom of ^{12}C?
   (A) 1 a.m.u. (B) 1.9923×10^{-23} g
   (C) 1.6603×10^{-22} g (D) 6 a.m.u.

3. For practical purpose, the average atomic mass of oxygen (which is an isotopic mixture of ^{16}O, ^{17}O and ^{18}O) is assumed to be equal to _____.
   (A) 15.0 u (B) 16.0 u
   (C) 17.0 u (D) 18.0 u

4. The natural isotopic abundance of ^{10}B is 19.60 % and ^{11}B is 80.40 %. The exact isotopic masses are 10.13 and 11.009 u respectively. The average atomic mass of boron is _____ u.
   (A) 10.84 (B) 11.00
   (C) 10.00 (D) 10.55

5. An element, X has the following isotopic composition.
   ^{200}X : 90% ; ^{199}X : 8.0% ; ^{202}X : 2.0%
   The weighted average atomic mass of the naturally occurring element X is close to _____.
   (A) 200 u (B) 210 u
   (C) 205 u (D) 199 u

6. The molecular mass of C_6H_5Cl in u is _____.
   (A) 112.5 u (B) 48.5 u
   (C) 78 u (D) 118.5 u

7. The mass of one molecule of O_2 in grams is _____. [Given: average atomic mass of O = 16 u and 1 u = 1.66×10^{-24} g]
   (A) 32.0×10^{-24} g (B) 26.6×10^{-24} g
   (C) 16.0×10^{-24} g (D) 53.1×10^{-24} g

8. The formula mass of KCl in u is _____.
   [Given : atomic mass of K = 39.1 u, Cl = 35.5 u]
   (A) 149.2 u (B) 78.2 u
   (C) 74.6 u (D) 113.7 u

1.8 Mole concept and molar mass

1. The number of moles of sodium oxide in 620 g is _____.
   (A) 1 mol (B) 10 moles
   (C) 18 moles (D) 100 moles

2. 1 mol of CH_4 contains _____.
   (A) 6.02×10^{23} atoms of C
   (B) 12 g of H
   (C) 1.81×10^{23} molecules of CH_4
   (D) 3.0 g of carbon

3. The mass of 1 atom of hydrogen is _____.
   (A) 1 g (B) 0.5 g
   (C) 1.6×10^{-24} g (D) 3.2×10^{-24} g

4. How many moles of electrons weigh one kilogram?
   (A) 6.022×10^{23}
   (B) $\frac{1}{9.108} \times 10^{31}$
   (C) $\frac{6.022}{9.108} \times 10^{54}$
   (D) $\frac{1}{9.108 \times 6.022} \times 10^{8}$

5. The number of atoms in 4.25 g of NH_3 is approximately _____.
   (A) 1×10^{23} (B) 2×10^{23}
   (C) 4×10^{23} (D) 6×10^{23}

6. Which of the following has maximum number of atoms?
   (A) 18 g of H_2O (B) 16 g of O_2
   (C) 4.4 g of CO_2 (D) 16 g of CH_4

7. The number of sulphur atoms present in 0.2 moles of S_8 molecules is _____.
   (A) 4.82×10^{23} (B) 9.63×10^{22}
   (C) 9.63×10^{23} (D) 1.20×10^{23}

8. The number of oxygen atoms in 4.4 g of CO_2 is approximately _____.
   (A) 1.2×10^{23} (B) 6×10^{22}
   (C) 6×10^{23} (D) 12×10^{23}

9. The number of atoms present in 0.05 g of water is _____.
   (A) 1.67×10^{23} (B) 1.67×10^{22}
   (C) 5.05×10^{21} (D) 1.67×10^{21}

10. What amount of dioxygen (in gram) contains 1.8×10^{22} molecules?
    (A) 0.0960 (B) 0.960
    (C) 9.60 (D) 96.0

11. The weight of a molecule of the compound $C_{60}H_{122}$ is _____.
    (A) 1.4×10^{-21} g (B) 1.09×10^{-21} g
    (C) 5.025×10^{23} g (D) 16.023×10^{23} g

12. The numbers of moles of $BaCO_3$, which contain 1.5 moles of oxygen atoms is _____.
(A) 0.5 (B) 1
(C) 3 (D) 6.02×10^{23}

13. The number of moles of oxygen in 1 L of air containing 21% oxygen by volume in standard conditions is _____.
(A) 0.0093 mol (B) 0.186 mol
(C) 0.21 mol (D) 2.10 mol

14. Which one of the following pairs of gases contains the same number of molecules?
(A) 16 g of O_2 and 14 g of N_2
(B) 8 g of O_2 and 22 g of CO_2
(C) 28 g of N_2 and 22 g of CO_2
(D) 32 g of O_2 and 32 g of N_2

15. The number of water molecules in 1 litre of water is _____.
(A) 18 (B) 18×1000
(C) N_A (D) 55.55 N_A

16. 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

1.9 Moles and gases

1. 0.5 mole of nitrogen gas represents _____.
(A) 6.02×10^{23} N_2 molecules
(B) 22.4 L of N_2 at S.T.P.
(C) 11.2 L of N_2 at S.T.P.
(D) none of these

2. The volume occupied by 4.4 g of CO_2 at STP is _____.
(A) 0.1 L (B) 0.224 L
(C) 2.24 L (D) 22.4 L

3. 11.2 cm^3 of oxygen gas at STP contains _____ moles of oxygen gas.
(A) 0.0005 (B) 0.01
(C) 0.029 (D) 0.5

4. The volume in dm^3 occupied by 60.0 g of ethane at STP is _____.
(A) 22.4 (B) 44.8
(C) 56.0 (D) 11.2

Platinum alloy as an International Prototype of the Kilogram

Have you ever wondered what is the reference for 1 kilogram???? It has been defined as the mass of the International Prototype of the Kilogram (IPK). The prototype is made of platinum-iridium (Pt-Ir) cylinder that is stored in an airtight jar at International Bureau of Weights and Measures in France. Pt-Ir was chosen because its mass remains constant for an extremely long time and it is resistant to the attack of different chemicals. This reference standard is used to calibrate or standardize different measuring devices such as analytical balances.

Concept Fusion

1. Identify the CORRECT statements.
(I) The mass of one mole of a substance in grams is called its molar mass.
(II) The formula mass of a substance is the sum of atomic masses of the atoms present in the formula.
(III) One mole is the amount of a substance that contains as many entities or particles as there are atoms in exactly 12 g of the carbon-12 isotope.
(A) I, II (B) II, III
(C) I, III (D) I, II, III

2. Under similar conditions, same mass of oxygen and nitrogen is taken. The ratio of their volumes will be _____.
(A) 7 : 8 (B) 3 : 5
(C) 6 : 5 (D) 9 : 2

3. Which of the following is a compound?
(A) Diamond (B) Charcoal
(C) Baking soda (D) 22 Carat Gold

4. Two elements, X (Atomic mass 16) and Y (Atomic mass 14) combine to form compounds A, B and C. The ratio of different masses of Y that combine with fixed mass of X in A, B and C is 1:3:5. If 32 parts by mass of X combine with 84 parts by mass of Y in B, then in C, 16 parts by mass of X will combine with _____.
(A) 14 parts by mass of Y
(B) 42 parts by mass of Y
(C) 70 parts by mass of Y
(D) 82 parts by mass of Y

5. Haemoglobin contains 0.33% of iron by weight. The molecular weight of haemoglobin is approximately 67200. The number of iron atoms (At. wt. of Fe = 56 u) present in one molecule of haemoglobin is _____.
(A) 1 (B) 2 (C) 4 (D) 6

6. In a flask, the weight ratio of $CH_4(g)$ and $SO_2(g)$ at 298 K and 1 bar is 1 : 2. The ratio of the number of molecules of $SO_2(g)$ and $CH_4(g)$ is_____.
(A) 1 : 4 (B) 4 : 1 (C) 1 : 2 (D) 2 : 1

7. 1 mL of water has 25 drops. Let N_0 be the Avogadro number. What is the number of molecules present in 1 drop of water?
(Density of water = 1 g/mL)
(A) $\frac{0.02}{9} N_0$ (B) $\frac{18}{25} N_0$
(C) $\frac{25}{18} N_0$ (D) $\frac{0.04}{25} N_0$

8. One mole of oxygen gas at STP is equal to:
(A) 6.022×10^{23} molecules of oxygen
(B) 6.022×10^{23} atoms of oxygen
(C) 16 g of oxygen
(D) 3.2 g of oxygen

9. At S.T.P., the volume of 7.5 g of gas is 5.6 L. The gas is _____.
(A) NO (B) N_2O
(C) CO (D) CO_2

MHT-CET Previous Years' Questions

1. What is the quantity of hydrogen gas liberated when 46 g sodium reacts with excess ethanol? **[2017]**
(A) 2.4×10^{-3} kg (B) 2.0×10^{-3} kg
(C) 4.0×10^{-3} kg (D) 2.4×10^{-2} kg

2. Which symbol replaces the unit of atomic mass, amu? **[2018]**
(A) u (B) A (C) M (D) n

3. What is the SI unit of density? **[2018]**
(A) g cm^{-3} (B) g m^{-3}
(C) kg m^{-3} (D) kg cm^{-3}

4. Boron has two isotopes with atomic masses 10 and 11. If its average atomic mass is 10.81, the abundance of lighter isotope is _____. **[2019]**
(A) 20% (B) 81% (C) 19% (D) 80%

5. The temperature of 32 °C is equivalent to **[2019]**
(A) 69 °F (B) 70 °F
(C) 85.6 °F (D) 89.6°F

6. The number of molecules present in 100 mL of water is (Given, Density of water-1 g/cc) **[2019]**
(A) 33.45×10^{23} (B) 3.345×10^{23}
(C) 1.083×10^{24} g (D) 1.083×10^{23}

7. The volume of 1 mole of any pure gas at standard temperature and pressure is always equal to **[2019]**
(A) 22.414 m^3 (B) 0.022414 m^3
(C) 2.2414 m^3 (D) 0.22414 m^3

8. The units nanometer and picometer are related as **[2020]**
(A) 1 nm = 10^{-12} pm (B) 1 nm = 10^{-9} pm
(C) 1 nm = 10^{-3} pm (D) 1 nm = 10^{3} pm

9. Which among the following elements has highest number of atoms in 1 g each?
(At. No.: Au 197, Na = 23, Cu = 63.5, Fe = 56) **[2020]**
(A) $Fe_{(s)}$ (B) $Au_{(s)}$
(C) $Na_{(s)}$ (D) $Cu_{(s)}$

10. Pure samples of copper carbonate synthesized in laboratory and found naturally if both contains 51.35% copper, 38.91% carbon and 9.74% oxygen by weight. This is an accordance with **[2020]**
(A) Law of definite proportion
(B) Law of conservation of mass
(C) Law of multiple proportion
(D) Law of combining volumes

11. Which of the following set of compounds does NOT demonstrate the law of multiple proportions? **[2020]**
(A) H_2O, H_2O_2 (B) SO_2, SO_3
(C) H_2O, CO_2, CH_4 (D) NO, NO_2

12. How many atoms of argon are present in 3.99 g of it? (Atomic mass = 39.9) **[2020]**
(A) 6.022×10^{22} (B) 3.011×10^{21}
(C) 3.011×10^{21} (D) 3.011×10^{22}

13. The number of moles of ammonia present in 5.6 dm^3 of its volume at STP is **[2020]**
(A) 0.25 (B) 1.0
(C) 0.50 (D) 0.75

14. In the reaction, $2KClO_{3(s)} \longrightarrow 2KCl_{(s)} + 3O_{2(g)}$; $\Delta H° = -78$ kJ. If 33.6 L of oxygen gas is liberated at STP, what is the mass of $KCl_{(s)}$ produced?
(Atomic mass: K = 39, Cl = 35.5 g mol^{-1}) **[2020]**
(A) 7.45 g (B) 48.0 g
(C) 24.0 g (D) 74.5 g

15. Which gas among the following contains maximum number of molecules at STP? (Molar masses in g mol^{-1}: CO_2 = 44, Ar = 39.9, CH_4 = 16, O_2 = 32) **[2020]**
(A) 13.3 g of Ar (B) 11 g of CO_2
(C) 24.0 g of O_2 (D) 16.0 g of CH_4

16. What is the number of moles and total number of atoms respectively present in 5.6 cm^3 of ammonia gas at STP? **[2020]**
(A) 1.505 mol and 6.022×10^{20} atoms
(B) 2.05 mol and 1.50×10^{20} atoms
(C) 2.50×10^{-4} mol and 6.022×10^{20} atoms
(D) 2.50×10^{-3} mol and 1.5×10^{20} atoms

17. The volume of oxygen required for complete combustion of 0.25 mole of methane at STP is **[2020]**
(A) 22.4 dm^3 (B) 5.6 dm^3
(C) 11.2 dm^3 (D) 7.46 dm^3

18. Calculate mass of 3.01×10^{24} atoms of an element having atomic mass 21.13. **[2020]**
(A) 118.5 g mol^{-1} (B) 105.65 g mol^{-1}
(C) 84.54 g mol^{-1} (D) 42.27 g mol^{-1}

19. "A given compound always contains exactly the same proportion of elements by weight" is a statement of _____. **[2021]**
(A) Law of combining volumes of gases
(B) Law of conservation of mass
(C) Law of multiple proportion
(D) Law of definite proportion

20. What is the total number of molecules present in 224 cm^3 of a gas at STP? **[2021]**
(A) 6.022×10^{20} (B) 6.022×10^{23}
(C) 6.022×10^{22} (D) 6.022×10^{21}

21. Number of molecules present in 5.4 g of urea is (Molar mass = 60 g mol^{-1}) **[2021]**
(A) 6.0×10^{22} (B) 5.4×10^{22}
(C) 9.0×10^{22} (D) 3.5×10^{23}

22. What is the mass of 44.8 dm^3 of methane gas under STP conditions? **[2021]**
(A) 24 g (B) 32 g
(C) 48 g (D) 16 g

23. Which of the following pair of compounds does not explain law of multiple proportions? **[2021]**
(A) SO_2 and SO_3 (B) O_2 and O_3
(C) CO and CO_2 (D) H_2O and H_2O_2

24. Find the value of –197 °C temperature in Kelvin. **[2021]**
(A) 47 K (B) 76 K
(C) 470 K (D) 760 K

25. What is the SI unit of density? **[2021]**
(A) kg dm^3 (B) kg m^{-3}
(C) kg m^3 (D) kg dm^{-3}

26. How many grams of H_2O are present in 0.25 mol of it? **[2021]**
(A) 0.25 g (B) 5.4 g
(C) 4.5 g (D) 6.1 g

27. How many atoms of argon are present in 52 mole of it? (At. Mass of Ar = 39) **[2021]**
(A) 1.1×10^{23} (B) 1.5×10^{25}
(C) 3.1×10^{25} (D) 1.2×10^{23}

28. What is the volume occupied by 24 g methane gas at STP? **[2021]**
(A) 33.6 dm^3 (B) 22.4 dm^3
(C) 67.2 dm^3 (D) 44.8 dm^3

29. What amount of oxygen is used at STP to obtain 9 g water from sufficient amount of hydrogen gas? **[2021]**
(A) 5.6 dm^3 (B) 22.4 dm^3
(C) 16.8 dm^3 (D) 11.2 dm^3

30. What is the volume (in dm^3) occupied by 75 g ethane at STP? **[2021]**
(A) 60.0 (B) 56.0
(C) 22.4 (D) 44.8

31. How many moles of urea are present in 5.4 g? (Molar mass = 60) **[2021]**
(A) 2.9 (B) 0.09
(C) 1.2 (D) 2.4

32. What is the density of water in kg dm^{-3} if its density in g cm^{-3} is 0.863? **[2022]**
(A) 7.86 (B) 0.863
(C) 8.63 (D) 4.60

33. Find the number of hydrogen atoms present in 6.0 of $H_2N - \overset{\overset{O}{\|}}{C} - NH_2$. **[2022]**
(A) 3.01×10^{23} (B) 4.06×10^{23}
(C) 2.4×10^{23} (D) 2.16×10^{23}

34. Mass of one molecule of oxygen in amu and in gram respectively is **[2022]**
(A) 16 u, 6.0×10^{-24} g
(B) 32 u, 53.13×10^{-24} g
(C) 53.13×10^{-24} u, 32 g
(D) 42 u, 5.313×10^{-24} g

35. How many moles of oxygen gas at STP are equivalent to 5.6 litre? **[2022]**
(A) $\frac{1}{8}$ mole
(B) $\frac{1}{2}$ mole
(C) 1 mole
(D) $\frac{1}{4}$ mole

36. Which of the following species has highest mass? **[2022]**
(A) 10 mL of water at room temperature
(B) $\frac{1}{2}$ mole of CH_4
(C) 1 mole of carbon atom
(D) 3.011×10^{23} atoms of oxygen

37. Find the quantity of dihydrogen required to prepare 2 L ammonia gas from 1 L dinitrogen. **[2022]**
(A) 2 L (B) 1 L
(C) 3 L (D) $\frac{3}{2}$ L

38. How many molecules of water are present in a drop of volume 0.05 mL? **[2022]**
(A) 6.00×10^{21} (B) 1.67×10^{21}
(C) 2.0×10^{21} (D) 5.02×10^{21}

39. Identify the gas from following so that 1 litre of it weighs 1.16 g at STP.
(A) C_2H_2 (B) CH_4
(C) O_2 (D) CO

40. Which of the following species has the lowest mass? **[2022]**
(A) $\frac{1}{4}$ mole of CH_4 gas
(B) 3.011×10^{23} atoms of oxygen
(C) 1 g atom of carbon
(D) 6.022×10^{23} molecules of water

41. What volume of water vapours will be produced when 10 volume of dihydrogen gas reacts with 5 volume of dioxygen gas? **[2022]**
(A) 100 (B) 5 (C) 10 (D) 50

42. Nitrogen reacts with hydrogen to produce ammonia. What is the ratio of reacting volume of nitrogen, hydrogen and ammonia gas respectively according to Gay-Lussac law? **[2022]**
(A) 1:2:3 (B) 3:1:2
(C) 1:3:2 (D) 2: 1:3

43. What is the value of temperature in degree Fahrenheit if the temperature in degree Celsius is 60? **[2022]**
(A) 65 °F (B) 140 °F
(C) 108 °F (D) 33 °F

44. How many moles of helium gas occupies 22.4 L at 0 °C and at 1 atmospheric pressure? **[2022]**
(A) 0.11 (B) 1.11
(C) 1.0 (D) 0.9

45. Calculate the mass of 200 atoms of sodium. (Atomic mass of sodium = 23 g mol^{-1}) **[2022]**
(A) 7.64×10^{-21} g (B) 4.37×10^{-23} g
(C) 5.12×10^{-22} g (D) 3.82×10^{-21} g

46. What volume of ammonia is formed when 10 dm^3 dinitrogen reacts with 30 dm^3 dihydrogen at same temperature and pressure? **[2023]**
(A) 30 dm^3 (B) 20 dm^3
(C) 15 dm^3 (D) 10 dm^3

47. What is number of atoms present in 2.24 dm^3 $NH_{3(g)}$ at STP? **[2023]**
(A) 6.022×10^{22} (B) 2.4088×10^{23}
(C) 1.8066×10^{22} (D) 6.022×10^{23}

48. What is the mass of $KClO_{3(s)}$ required to liberate 22. 4 dm^3 oxygen at STP during thermal decomposition?
(Molar Mass of $KClO_{3(s)}$ = 122.5 g/mol) **[2023]**
(A) 122.5 g (B) 81.67 g
(C) 10.25 g (D) 8.16 g

49. What is the number of molecules of dinitrogen present in 22.4 cm^3 at STP? **[2023]**
(A) 2.24×10^{20} (B) 6.022×10^{20}
(C) 4.4×10^{20} (D) 3.011×10^{20}

50. What is the mass in gram of 1 atom of an element if it's atomic mass is 10 u? **[2023]**
(A) 2.06056×10^{-22} g
(B) 1.66056×10^{-23} g
(C) 1.06056×10^{-24} g
(D) 3.66056×10^{-25} g

51. Which of the following pair of compounds demonstrates the law of multiple proportions? **[2023]**
(A) CH_4, CCl_4 (B) BF_3, NH_3
(C) CO, CO_2 (D) NO_2, CO_2

52. What volume of $CO_{2(g)}$ at STP is obtained by complete combustion of 6 g carbon? **[2023]**
(A) 22.4 dm^3 (B) 11.2 dm^3
(C) 5.6 dm^3 (D) 2.24 dm^3

53. What is the total number of moles of atoms present in 3.2 g methane? **[2023]**
(A) 4 mol (B) 3 mol
(C) 2 mol (D) 1 mol

54. What is the volume in dm^3 occupied by 60 g ethane at STP? **[2023]**
(A) 11.2 (B) 22.4
(C) 44.8 (D) 56

55. Identify numerical value from following that has same value in °C and °F? **[2023]**
(A) –8 (B) –11.2
(C) –40.0 (D) 0

56. Identify the physical quantity that is measured in Candela. **[2023]**
(A) Energy
(B) Work
(C) Force
(D) Luminous intensity

57. How many moles of nitrogen atoms are present in 8 g of ammonium nitrate?
(Molar mass of ammonium nitrate = 80) **[2023]**
(A) 0.1 mol (B) 0.2 mol
(C) 0.4 mol (D) 0.8 mol

58. Which from following substances consists of total 1 mole atoms in it? (Molar mass of $NH_3 = 17$, $H_2O = 18$, $N_2 = 28$, $CO_2 = 44$) **[2023]**
(A) 4.25 g NH_3 (B) 1.8 g H_2O
(C) 2.8 g N_2 (D) 4.4 g CO_2

59. Which of the following temperature values in Fahrenheit (°F) is equal to 50 °C? **[2023]**
(A) 90 °F (B) 100 °F
(C) 110 °F (D) 122 °F

60. According to reaction,
$Mg_{(s)} + 2HCl_{(aq)} \longrightarrow MgCl_{2(aq)} + H_{2(g)}\uparrow$
Calculate the mass of Mg required to liberate 4.48 dm^3 H_2 at STP.
(Molar mass of Mg = 24 g mol^{-1}) **[2023]**
(A) 12 g (B) 4.8 g
(C) 6 g (D) 2.4 g

61. What is the number of moles of carbon and hydrogen atoms respectively in 46 gram methoxymethane? **[2023]**
(A) 2 and 6 (B) 3 and 6
(C) 4 and 4 (D) 4 and 3

62. Which among the following elements contains the highest number of atoms in 1 g?
(At. Mass Na = 23, Fe = 56, Cu = 63.5, Au = 197) **[2023]**
(A) Cu (B) Na
(C) Au (D) Fe

63. Thermal decomposition of 10 g solid $CaCO_3$ is carried out in closed vessel, calculate the masses of $CaO_{(s)}$ and $CO_{2(g)}$ formed respectively. **[2023]**
(A) 6 g and 4 g (B) 4.5 g and 5.5 g
(C) 4 g and 6 g (D) 5.6 g and 4.4 g

64. Which of the following is NOT a SI unit? **[2023]**
(A) kg (B) K
(C) dm^3 (D) s

65. What is the number of molecules present in 0.1 kg of NaOH?
(Molar mass of NaOH = 40 g mol^{-1}) **[2023]**
(A) 6.022×10^{24} (B) 1.5055×10^{24}
(C) 6.022×10^{25} (D) 1.5055×10^{23}

Evaluation Test

1. Mass of 112 mL of oxygen gas at STP would be _____.
(A) 0.32 g (B) 0.64 g
(C) 0.16 g (D) 0.96 g

2. The largest number of molecules is present in _____.
(A) 54 g of nitrogen tetroxide
(B) 28 g of carbon dioxide
(C) 36 g of water
(D) 46 g of ethyl alcohol

3. The mass of a molecule of water is _____.
[Consider $N_A = 6 \times 10^{23}$]
(A) 3×10^{-26} kg (B) 3×10^{-25} kg
(C) 1.5×10^{-26} kg (D) 2.5×10^{-26} kg

4. The modern atomic weight scale is based on _____.
(A) ^{12}C (B) ^{16}O
(C) ^{1}H (D) ^{13}C

5. The number of moles of neon (At. Wt = 20 u) in 52 g of neon is _____.
(A) 1 (B) 2.6
(C) 52 (D) 20.8

6. SI unit of amount of a substance is _____.
(A) metre (B) mole
(C) ampere (D) candela

7. One requires 0.01 mole of NaOH. The mass of NaOH to be taken is _____.
(A) 0.04 g (B) 0.4 g
(C) 4.0 g (D) 40 g

8. A sample of phosphorus trichloride (PCl_3) contains 1.4 moles of the substance. How many atoms are there in the sample?
(A) 4 (B) 5.6
(C) 8.431×10^{23} (D) 3.372×10^{24}

9. The INCORRECT statement for 14 g of CO is _____.
(A) it occupies 2.24 L at NTP
(B) it corresponds to $\frac{1}{2}$ mole of CO
(C) it corresponds to half mole of N_2
(D) it corresponds to 3.01×10^{23} molecules of CO

10. The number of atoms of oxygen in 6.02×10^{24} CO molecules is _____.
(A) 1×10^{24} (B) 3.01×10^{24}
(C) 6.02×10^{23} (D) 6.02×10^{24}

11. One nanometre = _____m.
(A) 10^{9} (B) 10^{-15}
(C) 10^{-9} (D) 10^{-12}

12. The number of moles of helium in 'y' g of helium gas is equal to _____.
(A) y × 4 (B) y / 2
(C) y / 4 (D) y × 2

13. Which of the following is NOT a fundamental SI unit?
(A) Metre (B) Candela
(C) Ampere (D) Gram

14. The number of molecules in 22.4 dm^3 of nitrogen gas at STP is _____.
(A) 6.022×10^{20}
(B) 6.022×10^{23}
(C) 22.4×10^{20}
(D) 22.4×10^{23}

15. In an experiment, 2.16 g of copper was dissolved in nitric acid followed by ignition of the nitrate, which gave 2.70 g of copper oxide. In another experiment, 1.46 g of copper on heating in a current of air gave 1.83 g of copper oxide.
The percentage of copper in copper oxide is _____ and the above data illustrate the law of _____.
(A) 20 %, definite proportion
(B) 80 %, multiple proportion
(C) 20 %, multiple proportion
(D) 80 %, definite proportion

16. Identify the INCORRECT statement.
(A) The atoms of different elements are present in a compound in a fixed and definite ratio.
(B) Particles of an element consist of only one type of atoms.
(C) Constituent particles of pure substances have fixed composition.
(D) All the properties of a compound are same as that of its constituent elements.

17. The formula mass of $CaSO_4$ is _____.
[Atomic mass of Ca = 40 u, S = 32 u and O = 16 u]
(A) 120 u (B) 136 u
(C) 145 u (D) 156 u

18. Which of the following is CORRECT?
(A) 1 L = 1 dm^3
(B) 1 L = 10 dm^3
(C) 10 L = 1 dm^3
(D) 1 L = 1 m^3

19. If law of conservation of mass was to hold true, then 20.8 g of $BaCl_2$ on reaction with 9.8 g of H_2SO_4 will produce 7.3 g of HCl and $BaSO_4$ equal to _____.
(A) 11.65 g (B) 23.3 g
(C) 25.5 g (D) 30.6 g

20. Which of the following pairs of substances illustrates the law of multiple proportions?
(A) CO and CO_2
(B) H_2O and D_2O
(C) NaCl and NaBr
(D) MgO and $Mg(OH)_2$

21. Two containers of the same size are filled separately with H_2 gas and CO_2 gas. Both the containers under the same temperature and pressure will contain the same _____.
(A) number of atoms
(B) mass of gas
(C) number of molecules
(D) number of electrons

22. Substances which CANNOT be broken down into simpler substances by chemical process are called _____.
(A) elements (B) molecules
(C) compounds (D) all of these

23. Which of the following exists as a diatomic gas?
(A) Neon (B) Argon
(C) Helium (D) Nitrogen

24. The element whose atom has mass of 10.86×10^{-26} kg is _____.
(A) boron (B) calcium
(C) silver (D) zinc

25. Boron has two stable isotopes, ^{10}B (19 %) and ^{11}B (81 %). The atomic mass that should appear for boron in the periodic table is _____.
(A) 10.8 amu (B) 10.2 amu
(C) 11.2 amu (D) 10.0 amu

26. Avogadro number is the number of particles present in _____.
(A) 1 molecule (B) 1 atom
(C) 1 kg (D) 1 mole

27. One mole of H_2O corresponds to _____.
(A) 22.4 litres at 1 atm and 0 °C
(B) 12.04×10^{23} atoms of hydrogen and 6.02×10^{23} atoms of oxygen
(C) 18 g H_2O
(D) all of these

28. If N_A is the Avogadro's number then number of valence electrons in 4.2 g of nitride ions N^{3-} is _____.
(A) 2.4 N_A (B) 4.2 N_A
(C) 1.6 N_A (D) 3.2 N_A

29. Which one of the following pairs of gases contains the same number of molecules?
(A) 16 g of O_2 and 14 g of N_2
(B) 8 g of O_2 and 22 g of CO_2
(C) 28 g of N_2 and 22 g of CO_2
(D) 32 g of O_2 and 32 g of N_2

30. Number of moles of water in 488 g of $BaCl_2.2H_2O$ is_____. (At. wt. of Ba = 137 u)
(A) 2 moles (B) 4 moles
(C) 3 moles (D) 5 moles

31. The CGS units of density is:
(A) g cm^{-3} (B) kg m^{-3}
(C) g dm^{-3} (D) kg cm^{-3}

32. 11.2 cm^3 of hydrogen gas at STP contains _____.
(A) 0.0005 mol (B) 0.01 mol
(C) 0.029 mol (D) 0.5 mol

33. If N_A is the Avogadro's number then number of electrons in 2 moles of helium (He) is _____.
(A) 4 N_A (B) 3 N_A
(C) 2 N_A (D) N_A

34. The mass of carbon present in 0.5 mole of $K_4[Fe(CN)_6]$ is _____.
(A) 1.8 g (B) 18 g
(C) 3.6 g (D) 36 g

35. In SO_2 and SO_3, the ratio of the masses of oxygen which combine with a fixed mass of sulphur is 2 : 3. This is an example of the law of _____.
(A) constant proportion
(B) multiple proportion
(C) reciprocal proportion
(D) conservation of mass

Answer Key of the chapter: *Some Basic Concepts of Chemistry* & Evaluation Test is given at the end of the book.

Solutions to the relevant questions of this chapter & Evaluation Test can be accessed by scanning the adjacent QR code in ***Quill - The Padhai App.***

Chapter 1: Some Basic Concepts of Chemistry

Classical Thinking

1.1:	1. (C)
1.2:	1. (C) 2. (C) 3. (C) 4. (D) 5. (D) 6. (D)
1.3:	1. (B) 2. (B) 3. (D) 4. (A) 5. (B) 6. (A) 7. (B)
1.4:	1. (C) 2. (C) 3. (B) 4. (C) 5. (A) 6. (B) 7. (C) 8. (B)
1.5:	1. (C)
1.6:	1. (A)
1.7:	1. (A) 2. (A) 3. (A)
1.8:	1. (D) 2. (C) 3. (C) 4. (C) 5. (D) 6. (B) 7. (A) 8. (C) 9. (D) 10. (C) 11. (B)
1.9:	1. (A) 2. (B)

Critical Thinking

1.2:	1. (A) 2. (D) 3. (D) 4. (C) 5. (D) 6. (D)
1.3:	1. (D) 2. (A) 3. (C) 4. (D) 5. (A) 6. (B)
1.4:	1. (C) 2. (D) 3. (B) 4. (A) 5. (B) 6. (C)
1.6:	1. (D)
1.7:	1. (D) 2. (B) 3. (B) 4. (A) 5. (A) 6. (A) 7. (D) 8. (C)
1.8:	1. (B) 2. (A) 3. (C) 4. (D) 5. (D) 6. (D) 7. (C) 8. (A) 9. (C) 10. (B) 11. (A) 12. (A) 13. (A) 14. (A) 15 (D) 16. (B)
1.9:	1. (C) 2. (C) 3. (A) 4. (B)

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