

SAMPLE CONTENT



TRIUMPH

MHT-CET

CHEMISTRY

BASED ON STD. XI & XII SYLLABUS OF MHT-CET

6580

Chapterwise and
Topicwise MCQs

- ▶ Previous Years' Questions (PYQs)
- ▶ MCQs Segregated into 3 levels
- ▶ Model Question Papers
- ▶ Evaluation Tests
- ▶ Quick Review
- ▶ Smart Keys

Includes
Authentic Questions
From Latest
MHT-CET
Examination

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Target Publications® Pvt. Ltd.

TRIUMPH MHT-CET CHEMISTRY

6580
MCQs

Based on the latest Syllabus of MHT-CET

Salient Features

- Includes chapters of Std. XII and relevant chapters of Std. XI as per the latest MHT-CET Syllabus
- Includes '6580' MCQs
- Quick Review and exhaustive subtopic wise coverage of MCQs
- Compilation of all 'Important Formulae' in relevant chapters
- Solved Previous Years' MHT-CET questions till 2023
- Evaluation Test for each chapter
- Special Inclusion: Compilation of organic reaction based MCQs
- Two Model Question Papers with answer keys (Solutions provided through Q.R. codes)
- Two Question Papers & Answer Keys of MHT-CET 2023 (Solutions provided through Q.R. codes)
- 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 Standard 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** book 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.

The exclusive addition of chapter '**Organic Reactions: Compilation of Organic Reaction Based MCQs**' leads students to an intuitive understanding of how different organic reactions can be used in specific sequences for the synthesis organic molecule.

The two **Model Question Papers** given at the end of the book are specially prepared to gauge the student's preparedness to appear for the MHT-CET examination. Two **MHT-CET 2023 Question Papers** have been provided to offer students a glimpse of the complexity of the questions asked in the examination.

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

Disclaimer

This reference book is transformative work based on Std. XI and XII Chemistry Textbooks; Reprint: 2022 published by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune. We the publishers are making this reference book which constitutes as fair use of textual contents which are transformed by adding and elaborating, with a view to simplify the same to enable the students to understand, memorize and reproduce the same in examinations.

This work is purely inspired upon the course work as prescribed by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune. Every care has been taken in the publication of this reference book by the Authors while creating the contents. The Authors and the Publishers shall not be responsible for any loss or damages caused to any person on account of errors or omissions which might have crept in or disagreement of any third party on the point of view expressed in the reference book.

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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.

Quick Review

Formulae

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.

Classical Thinking

Critical Thinking

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 those 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.

Concept Fusion

MHT-CET Previous Years' Questions

MHT-CET Previous Years' Questions section encompasses questions from MHT-CET examinations.

This is our attempt to give students practice of MHT-CET questions and advance them to acquire knack essential to solve such questions.

Evaluation Test encompasses questions based on concepts covered in the entire chapter.

This is our attempt to allow self-assessment of the chapter

Evaluation Test

Continued...

FEATURES

Every section is **segregated sub-topic wise**.

This is our attempt to cater to individualistic pace and preferences of studying a chapter in students and enable easy assimilation of questions based on the specific concept.

Sub-topic wise Segregation

QR Code

QR Code includes

- Video/pdf links for boosting conceptual retention
- Solutions to MCQs and Evaluation Test for each chapter
- Solutions to Model Question Papers I and II
- Solutions to MHT-CET 2023 Question Papers

Real-world applications

Each chapter includes **real-world applications or examples** related to the concept discussed.

This is our attempt to link learning to the life and make students conscious of how Chemistry is related to everything we see, feel, touch and taste.

Smart Keys

Smart Keys comprise a set of remarkable study techniques contrived to benefit students.

This is our attempt to promote quick, innovative, and divergent thinking as well as enable the students to perceive the underlying depth and implications of concepts.

Shortcuts

Shortcuts incorporate important theoretical or formula based short tricks, beneficial in solving MCQs.

Key Notes For Good Practice

Key Notes For Good Practice

includes thoughtful/logical key concepts and common misconceptions in the chapter.

Smart Code

Smart Code showcases simple and smart mnemonic created for selected concepts.

Caution

Caution apprises students about mistakes often made while solving MCQs.

Thinking Hatke

Thinking Hatke reveals quick witted approach to crack the specific question.

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
 - 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
 - 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

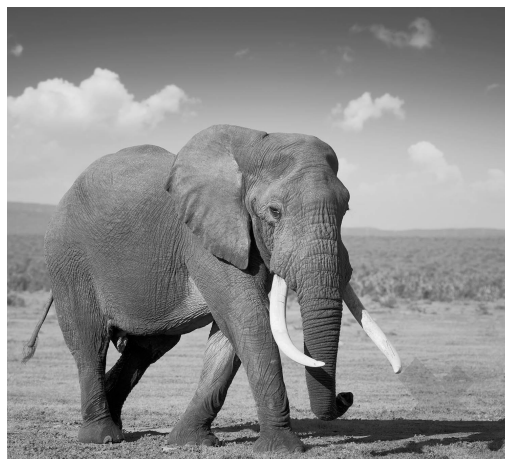
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Practice test Papers are the only way to assess your preparedness for the Exams.
Scan the adjacent QR code to know more about our **"MHT-CET Chemistry Test Series with Answer Key & Solutions"** book for the MHT-CET Entrance examination.



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 $^{12}\text{C}/^{13}\text{C}$, $^{14}\text{N}/^{15}\text{N}$ and $^{86}\text{Sr}/^{87}\text{Sr}$ 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

1.1	Introduction	1.5	Dalton's atomic theory
1.2	Nature of chemistry	1.6	Atomic and molecular masses
1.3	Properties of matter and their measurement	1.7	Mole concept and molar mass
1.4	Laws of chemical combination	1.8	Moles and gases

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 Celsius scale corresponds $9/5$ degree rise in Fahrenheit. Hence, we get equation, $^\circ\text{F} = 9/5^\circ\text{C} + 32$.
- Units can be represented 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.

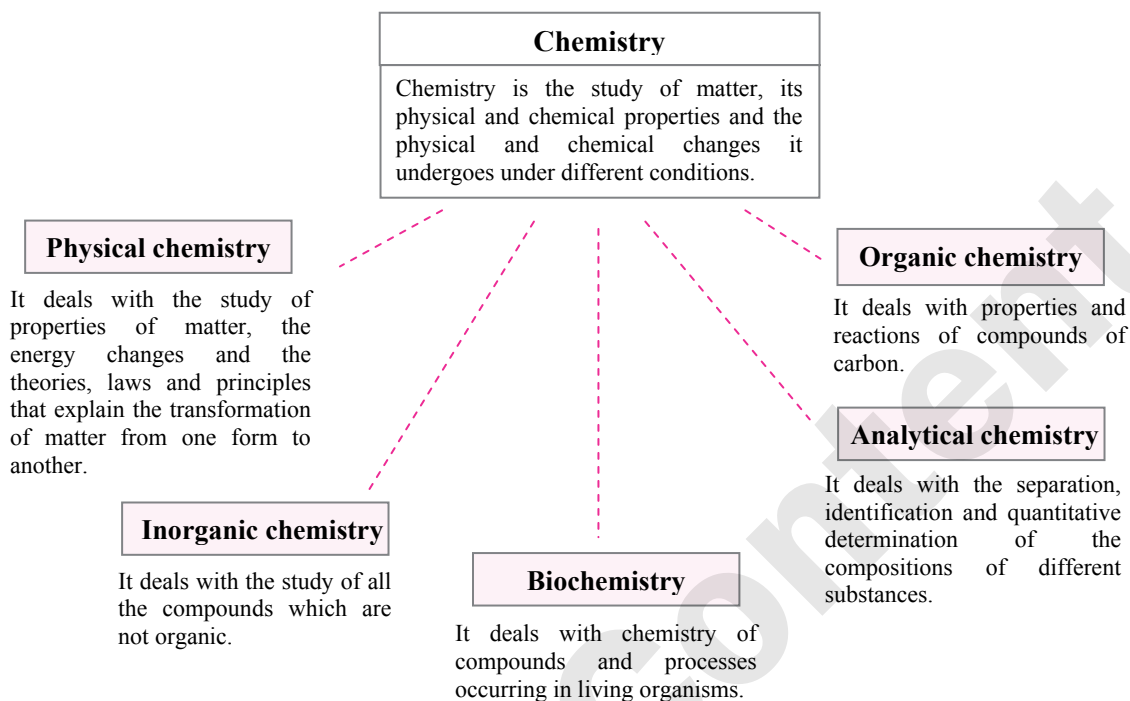
Fundamental Constants in This Chapter

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

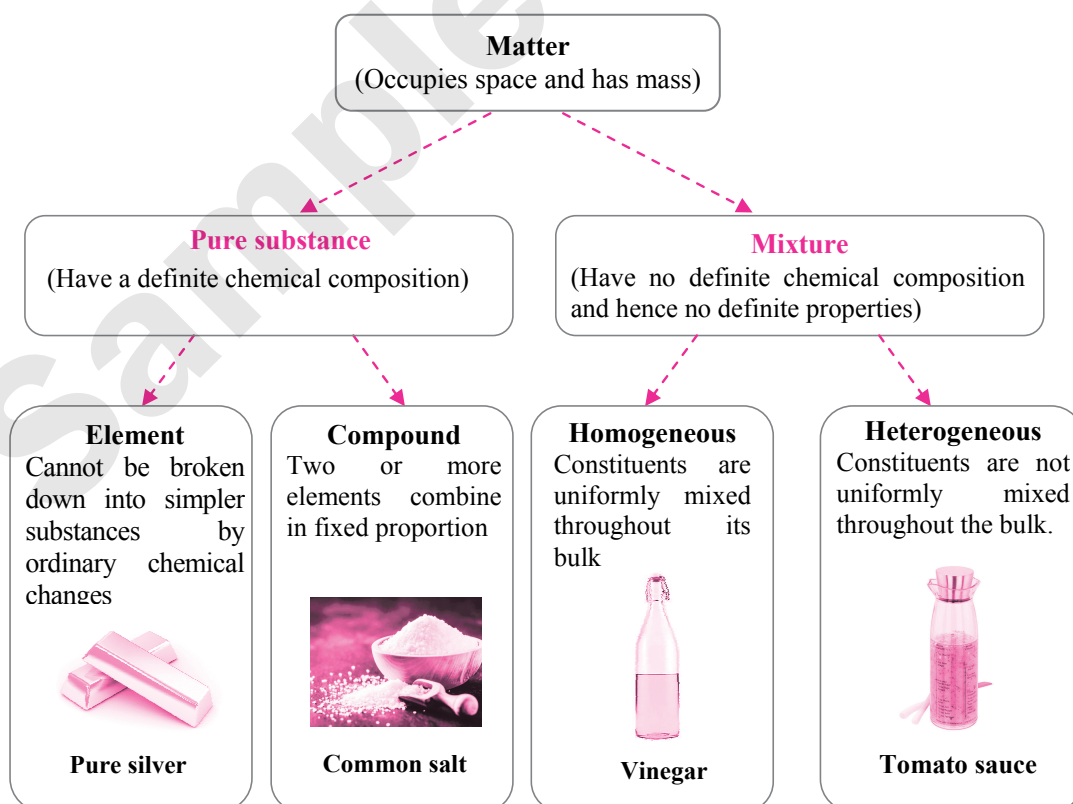


Quick Review

➤ Branches of chemistry:

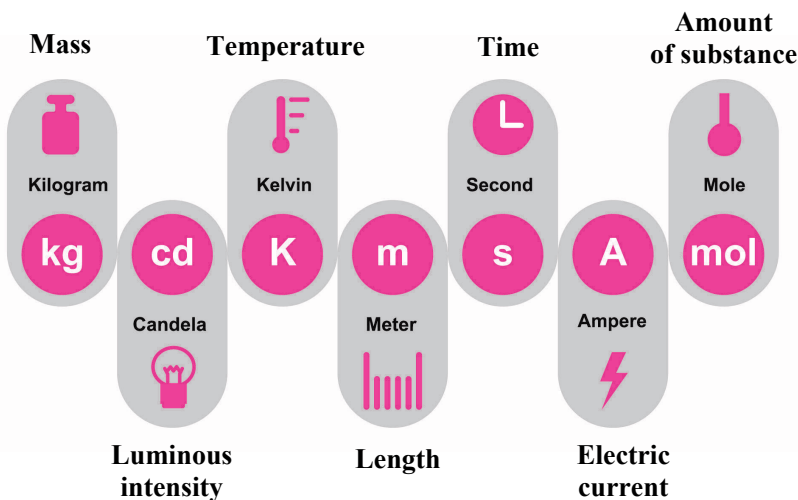


➤ Classification of matter (On basis of chemical composition):

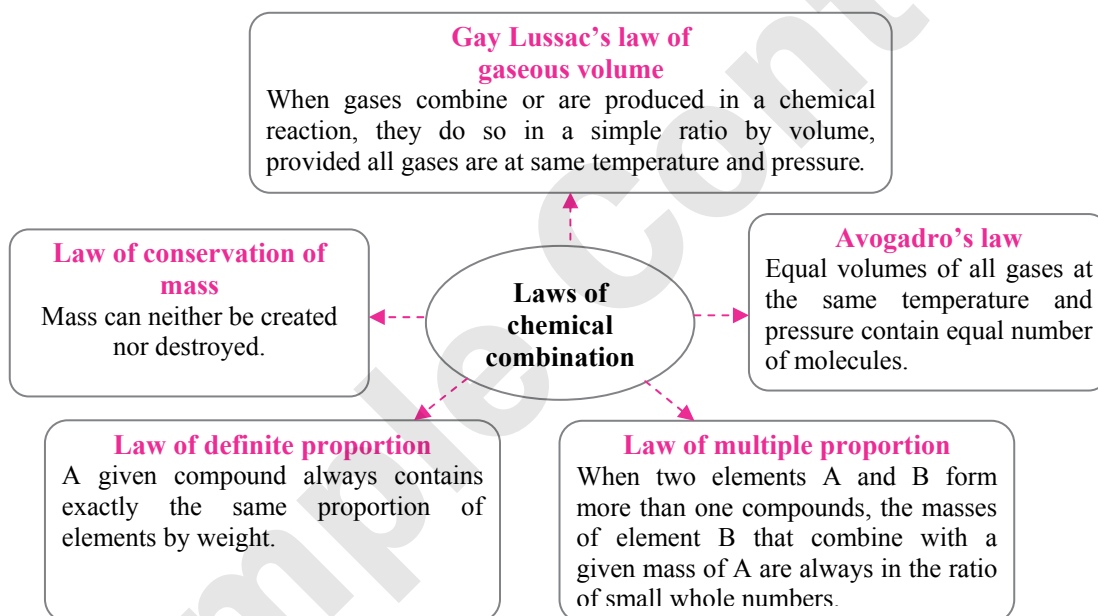




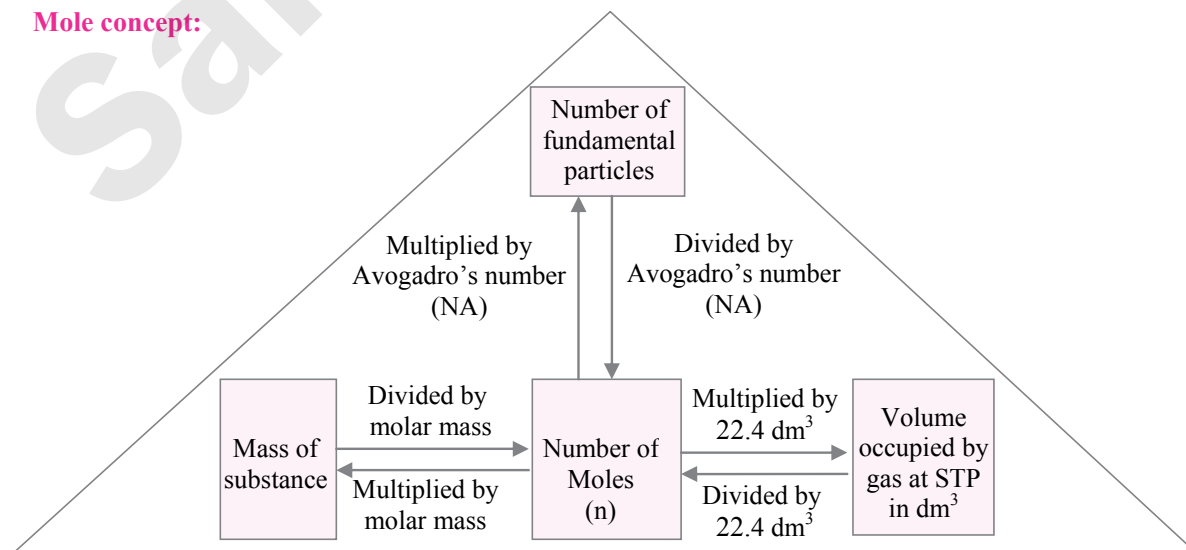
➤ SI Fundamental units



➤ Laws of chemical combination:



➤ Mole concept:





Formulae

1. Celsius to Fahrenheit

$$^{\circ}\text{F} = \frac{9}{5} (^{\circ}\text{C}) + 32$$

2. Celsius to Kelvin

$$\text{K} = ^{\circ}\text{C} + 273.15$$

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

$$= \text{Number of moles} \times \text{Avogadro number}$$

$$= \text{Number of moles} \times 6.022 \times 10^{23}$$

7. Molar volume of a gas at STP

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

8. Number of moles

$$n = \frac{\text{Volume of a gas at STP}}{\text{Molar volume of a gas}}$$

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

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

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
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) $2\text{CO}_{(\text{g})} + \text{O}_{2(\text{g})} \longrightarrow 2\text{CO}_{2(\text{g})}$
(B) $\text{O}_{2(\text{g})} + 2\text{H}_{2(\text{g})} \longrightarrow 2\text{H}_2\text{O}_{(\text{g})}$
(C) $\text{H}_{2(\text{g})} + \text{F}_{2(\text{g})} \longrightarrow 2\text{HF}_{(\text{g})}$
(D) $\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \longrightarrow 2\text{NH}_{3(\text{g})}$

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
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

1.3 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 = 10³ mL
- (B) 1 dm³ = 1 L
- (C) 1 L = 10³ m³
- (D) 1 L = 10³ cm³
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.
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 H₂O₂ and H₂O 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 'b₁' and 'b₂' g of B respectively. According to law of multiple proportion, _____.
- (A) b₁ = b₂
- (B) b₁ and b₂ bear a simple whole number ratio
- (C) a is always equal to b₁
- (D) no relation exists between b₁ and b₂
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 (D₂O)
- (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 N₂ and 2 L of H₂ are allowed to react?
- (A) 0.665 (B) 1.0
- (C) 1.33 (D) 4.00



1.6 Dalton's atomic theory

- 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

- 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
- 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.
- 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
- 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
- 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
- The molecular mass of $\text{C}_6\text{H}_5\text{Cl}$ in u is _____.
(A) 112.5 u (B) 48.5 u
(C) 78 u (D) 118.5 u
- The mass of one molecule of O_2 in grams is _____. [Given: average atomic mass of $\text{O} = 16$ u and $1 \text{ u} = 1.66 \times 10^{-24}$ 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
- The formula mass of KCl in u is _____.
[Given : atomic mass of $\text{K} = 39.1$ u, $\text{Cl} = 35.5$ u]
(A) 149.2 u (B) 78.2 u
(C) 74.6 u (D) 113.7 u

1.8 Mole concept and molar mass

- The number of moles of sodium oxide in 620 g is _____.
(A) 1 mol (B) 10 moles
(C) 18 moles (D) 100 moles
- 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
- 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
- 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) $\frac{1}{9.108 \times 6.022} \times 10^8$
- 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}
- 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
- 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}
- 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}
- 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}
- What amount of dioxygen (in gram) contains 1.8×10^{22} molecules?
(A) 0.0960 (B) 0.960
(C) 9.60 (D) 96.0
- The weight of a molecule of the compound $\text{C}_{60}\text{H}_{122}$ 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) $6.02 \times 10^{23} \text{N}_2$ 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 $\text{CH}_4(\text{g})$ and $\text{SO}_2(\text{g})$ at 298 K and 1 bar is 1 : 2. The ratio of the number of molecules of $\text{SO}_2(\text{g})$ and $\text{CH}_4(\text{g})$ 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) $1 \text{ nm} = 10^{-12} \text{ pm}$ (B) $1 \text{ nm} = 10^{-9} \text{ pm}$
(C) $1 \text{ nm} = 10^{-3} \text{ pm}$ (D) $1 \text{ nm} = 10^3 \text{ pm}$

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) $\text{Fe}_{(\text{s})}$ (B) $\text{Au}_{(\text{s})}$
(C) $\text{Na}_{(\text{s})}$ (D) $\text{Cu}_{(\text{s})}$
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 in 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) $\text{H}_2\text{O}, \text{H}_2\text{O}_2$ (B) SO_2, SO_3
(C) $\text{H}_2\text{O}, \text{CO}_2, \text{CH}_4$ (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, $2\text{KClO}_{3(\text{s})} \longrightarrow 2\text{KCl}_{(\text{s})} + 3\text{O}_{2(\text{g})}$; $\Delta H^\circ = -78 \text{ kJ}$. If 33.6 L of oxygen gas is liberated at STP, what is the mass of $\text{KCl}_{(\text{s})}$ 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} : $\text{CO}_2 = 44$, $\text{Ar} = 39.9$, $\text{CH}_4 = 16$, $\text{O}_2 = 32$) [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) $105.65 \text{ g mol}^{-1}$
 (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 $\text{Ar} = 39$) [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 $\text{H}_2\text{N}-\overset{\text{O}}{\parallel}\text{C}-\text{NH}_2$. [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, $6.0 \times 10^{-24} \text{ g}$
 (B) 32 u, $53.13 \times 10^{-24} \text{ g}$
 (C) $53.13 \times 10^{-24} \text{ u}$, 32 g
 (D) 42 u, $5.313 \times 10^{-24} \text{ g}$
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 dm³ dinitrogen reacts with 30 dm³ dihydrogen at same temperature and pressure? [2023]
 (A) 30 dm³ (B) 20 dm³
 (C) 15 dm³ (D) 10 dm³
47. What is number of atoms present in 2.24 dm³ $\text{NH}_3(\text{g})$ 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 $\text{KClO}_{3(\text{s})}$ required to liberate 22.4 dm³ oxygen at STP during thermal decomposition? (Molar Mass of $\text{KClO}_{3(\text{s})}$ = 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 cm³ 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) $\text{CH}_4, \text{CCl}_4$ (B) BF_3, NH_3
 (C) CO, CO_2 (D) NO_2, CO_2
52. What volume of $\text{CO}_{2(\text{g})}$ at STP is obtained by complete combustion of 6 g carbon? [2023]
 (A) 22.4 dm³ (B) 11.2 dm³
 (C) 5.6 dm³ (D) 2.24 dm³
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 dm³ 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 $\text{NH}_3 = 17$, $\text{H}_2\text{O} = 18$, $\text{N}_2 = 28$, $\text{CO}_2 = 44$) [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 ($^\circ\text{F}$) is equal to 50°C ? [2023]
(A) 90°F (B) 100°F
(C) 110°F (D) 122°F
60. According to reaction,
 $\text{Mg}_{(\text{s})} + 2\text{HCl}_{(\text{aq})} \longrightarrow \text{MgCl}_{2(\text{aq})} + \text{H}_{2(\text{g})}\uparrow$
Calculate the mass of Mg required to liberate $4.48 \text{ dm}^3 \text{ H}_2$ 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 $\text{CaO}_{(\text{s})}$ and $\text{CO}_{2(\text{g})}$ 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) $3 \times 10^{-26} \text{ kg}$ (B) $3 \times 10^{-25} \text{ kg}$
(C) $1.5 \times 10^{-26} \text{ kg}$ (D) $2.5 \times 10^{-26} \text{ kg}$
4. The modern atomic weight scale is based on _____.
(A) ^{12}C (B) ^{16}O
(C) ^1H (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) $y \times 4$ (B) $y / 2$
 (C) $y / 4$ (D) $y \times 2$
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) $1 \text{ L} = 1 \text{ dm}^3$
 (B) $1 \text{ L} = 10 \text{ dm}^3$
 (C) $10 \text{ L} = 1 \text{ dm}^3$
 (D) $1 \text{ L} = 1 \text{ m}^3$
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 $\text{Mg}(\text{OH})_2$
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 $10.86 \times 10^{-26} \text{ kg}$ 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

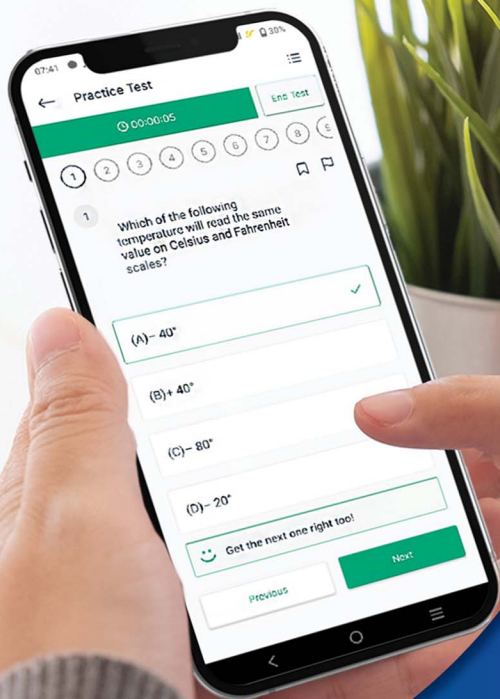


30. Number of moles of water in 488 g of $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ is _____. (At. wt. of Ba = 137 u)
(A) 2 moles (B) 4 moles
(C) 3 moles (D) 5 moles
31. The CGS units of density is:
(A) g cm^{-3} (B) kg m^{-3}
(C) g dm^{-3} (D) kg cm^{-3}
32. 11.2 cm^3 of hydrogen gas at STP contains _____.
(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 $\text{K}_4[\text{Fe}(\text{CN})_6]$ 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.

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