

Based on relevant chapters from Std. XI (Maharashtra State Board)  
as per latest MHT-CET Paper Pattern

# MHT-CET Triumph Chemistry

Based on Maharashtra State Board Syllabus

## STD. XI Sci.

### Salient Features

- Includes selected chapters as per latest MHT-CET Paper Pattern
- Exhaustive subtopic wise coverage of MCQs
- Quick Review and/or Important Formulae provided for all the chapters
- Hints included for relevant questions
- Various competitive exams questions updated till the latest year
- Includes solved MCQs from JEE (Main), AIPMT / NEET (UG) 2015, 2016 and 2017
- Includes solved MCQs up until MH-CET 2014.
- Evaluation Test provided at the end of each chapter

*Solutions/hints to Evaluation Test available in downloadable PDF format at  
[www.targetpublications.org/tp11261](http://www.targetpublications.org/tp11261)*

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# 01 Some Basic Concepts of Chemistry

## *Subtopics*

- 1.0 Introduction
- 1.1 Importance and scope of chemistry
- 1.2 Historical approach to particulate nature of matter
- 1.3 Laws of chemical combination
- 1.4 Dalton's atomic theory
- 1.5 Concepts of elements, atoms and molecules
- 1.6 Atomic and molecular masses
- 1.7 Avogadro's law, Avogadro's number and mole concept
- 1.8 Percentage composition and empirical and molecular formula
- 1.9 Chemical reactions and stoichiometry

***Platinum alloy as an International Prototype of the Kilogram***

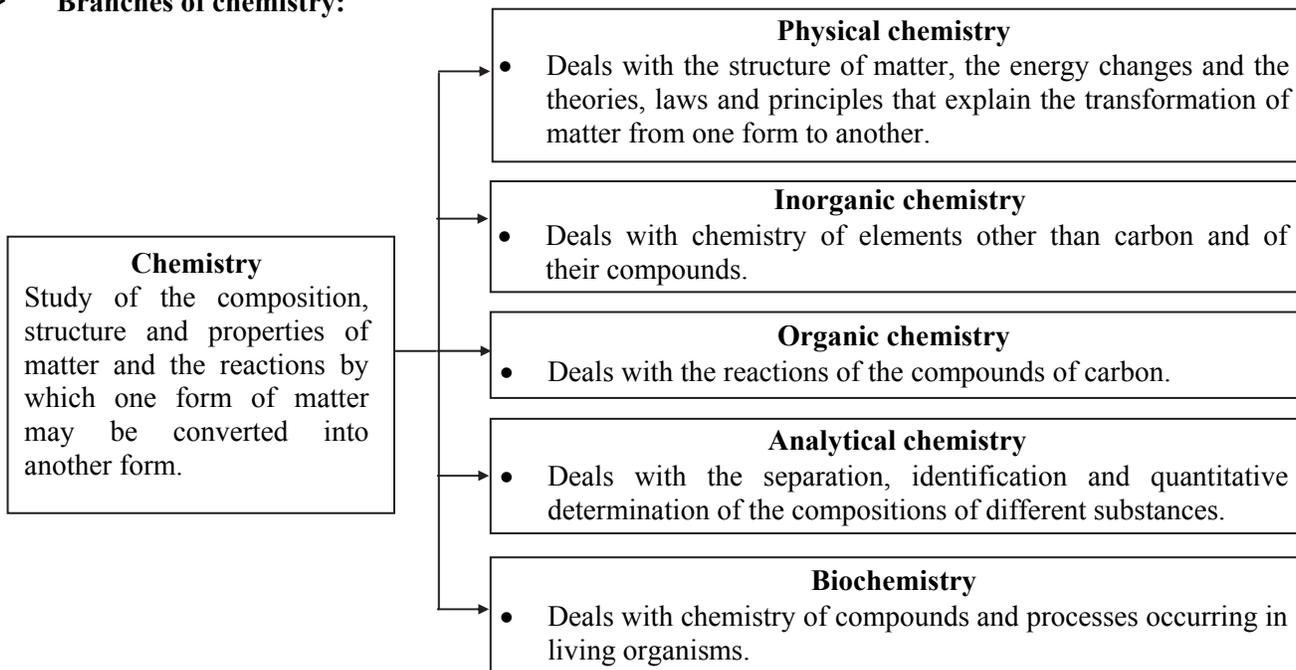


*Have you ever wondered what is the reference for 1 kilogram???? It has been defined as the mass of the International Prototype of the Kilogram. The prototype is made of platinum-iridium (Pt-Ir) cylinder that is stored in an airtight jar at International Bureau of Weights and Measures in France. Pt-Ir 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.*

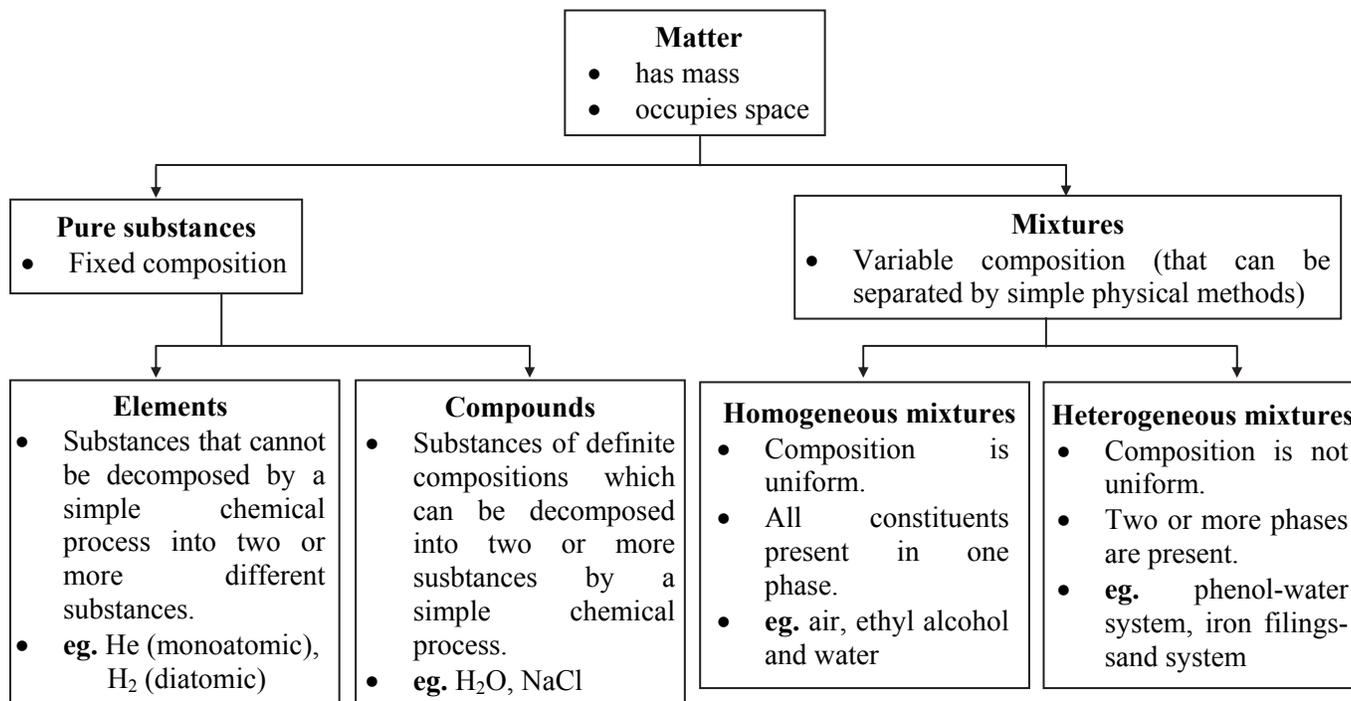


**Quick Review**

➤ **Branches of chemistry:**

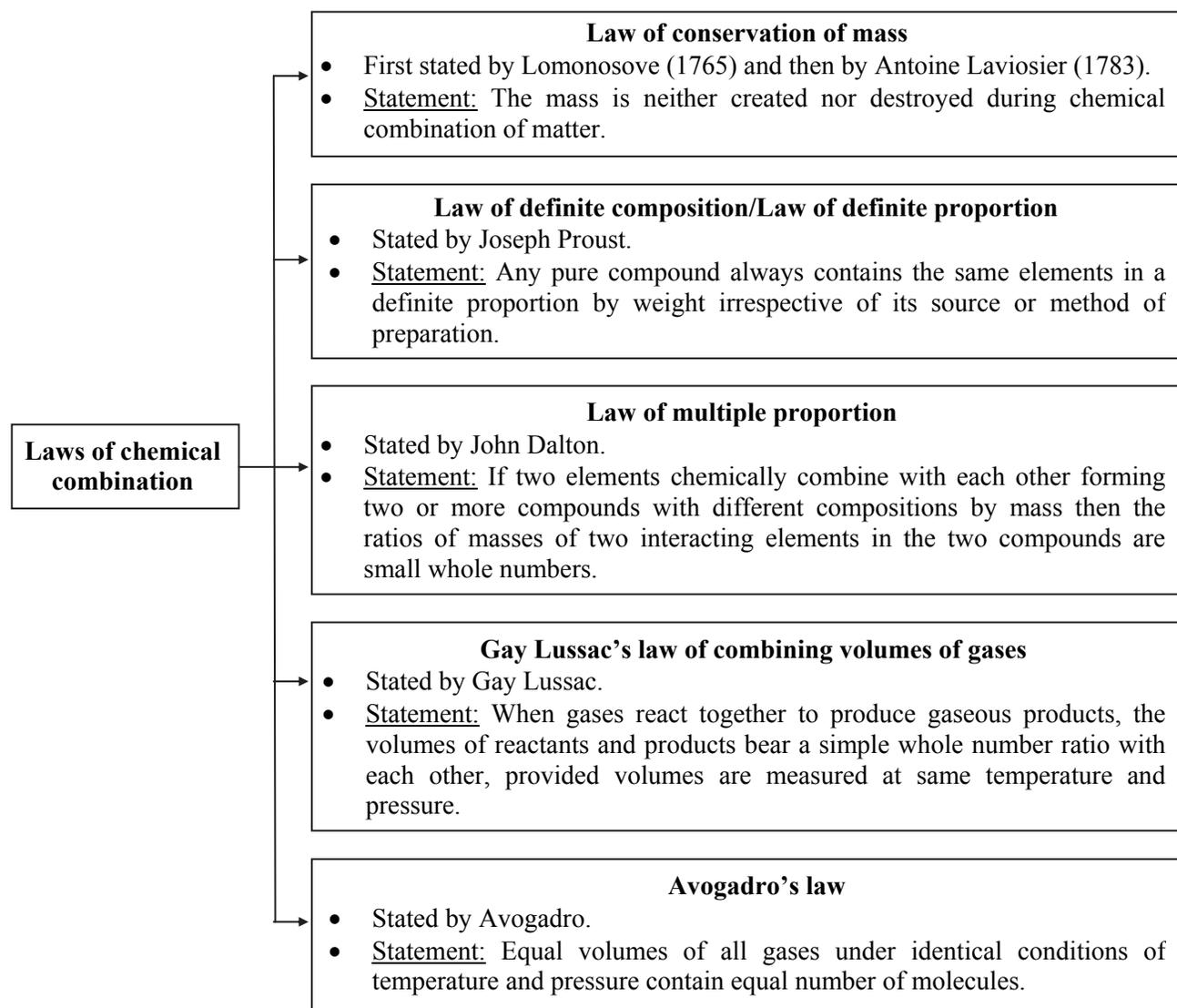


➤ **Classification of matter:**





➤ **Laws of chemical combination:**

**Formulae**

- Atomic mass unit (1 amu) =  $\frac{1}{12}$  th of a  $^{12}\text{C}$ -atom  
=  $1.66 \times 10^{-27}$  kg
- 1 Mole =  $6.022 \times 10^{23}$  particles  
(atoms/molecules/ions/electrons)
- Number of moles (n)  
=  $\frac{\text{Mass of the substance}}{\text{Molar mass of the substance}}$
- Mass of an atom =  $\frac{\text{Atomic mass}}{6.022 \times 10^{23}}$
- Mass of a molecule =  $\frac{\text{Molecular mass}}{6.022 \times 10^{23}}$

- Number of molecules  
=  $n \times \text{Avogadro number } (N_A)$
- Atomicity = number of atoms in a molecule
- Total number of atoms in molecule  
=  $n \times N_A \times \text{Atomicity}$
- Volume occupied by one mole of a gas at STP  
= 22.4 L = 22.4 dm<sup>3</sup>
- Molecular formula = r × Empirical formula
- $r = \frac{\text{Molecular mass}}{\text{Empirical mass}}$
- Average atomic mass  
=  $\frac{\text{Sum of (Isotopic mass} \times \text{its \% abundance)}}{100}$
- Avogadro's law,  $V \propto n$  (At constant T and P)



## Classical Thinking



### 1.0 Introduction

- \_\_\_\_\_ chemistry deals with the chemistry of elements other than carbon and of their compounds.  
(A) Organic (B) Physical  
(C) Inorganic (D) Bio
- The branch of chemistry, which deals with the separation, identification and quantitative determination of the composition of different substances, is called \_\_\_\_\_ chemistry.  
(A) organic (B) inorganic  
(C) analytical (D) bio



### 1.1 Importance and scope of chemistry

- Solar energy can be converted into electrical energy using \_\_\_\_\_ cell.  
(A) Daniel (B) lithium ion  
(C) photovoltaic (D) nickel cadmium
- In computers, \_\_\_\_\_ chips are used as microprocessors.  
(A) carbon (B) phosphorus  
(C) titanium (D) silicon



### 1.2 Historical approach to particulate nature of matter

- Which one of the following is NOT a mixture?  
(A) Iodized table salt  
(B) Gasoline  
(C) Liquefied Petroleum Gas (L.P.G.)  
(D) Distilled water
- Which of the following is NOT a homogeneous mixture?  
(A) Ethanol + water  
(B) Oxygen gas + nitrogen gas  
(C) Phenol + water  
(D) Acetic acid + water
- The phlogiston theory was suggested for \_\_\_\_\_ reaction.  
(A) neutralisation (B) oxidation  
(C) reduction (D) combustion
- Substances, which CANNOT be decomposed into two or more different substances by chemical process, are called \_\_\_\_\_.  
(A) alloys (B) molecules  
(C) elements (D) compounds

- The arbitrarily decided and universally accepted standards are called \_\_\_\_\_.  
(A) fundamentals (B) units  
(C) measures (D) symbols
- There are \_\_\_\_\_ fundamental SI units.  
(A) 3 (B) 5  
(C) 6 (D) 7
- SI unit of velocity is \_\_\_\_\_.  
(A)  $\text{km s}^{-1}$  (B)  $\text{km hr}^{-1}$   
(C)  $\text{m s}^{-2}$  (D)  $\text{m s}^{-1}$
- Electrochemical equivalent has unit \_\_\_\_\_.  
(A)  $\text{kg m s}^{-1}$  (B)  $\text{kg m}^2 \text{s}^{-1}$   
(C)  $\text{kg C}^{-1}$  (D)  $\text{kg m}^{-1} \text{s}^{-2}$
- Magnitude of 'pico-' is \_\_\_\_\_.  
(A)  $10^{-12}$  (B)  $10^{-15}$   
(C)  $10^{12}$  (D)  $10^{-9}$



### 1.3 Laws of chemical combination

- After a chemical reaction, the total mass of reactants and products \_\_\_\_\_.  
(A) always increases  
(B) always decreases  
(C) does not change  
(D) either increases or decreases
- 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
- If the law of conservation of mass was to hold true, then 20.8 g of  $\text{BaCl}_2$ , on reaction with 9.8 g of  $\text{H}_2\text{SO}_4$  will produce 7.3 g of HCl and \_\_\_\_\_ of  $\text{BaSO}_4$ .  
(A) 11.65 g (B) 23.3 g  
(C) 25.5 g (D) 30.6 g
- 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



18. Two containers of the same size are filled separately with  $\text{H}_2$  gas and  $\text{CO}_2$  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
19. In  $\text{SO}_2$  and  $\text{SO}_3$ , 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
20. Which of the following reactions has the ratio of volumes of reacting gases and the product as 1:2:2?
- (A)  $2\text{CO}_{(g)} + \text{O}_{2(g)} \longrightarrow 2\text{CO}_{2(g)}$   
(B)  $\text{O}_{2(g)} + 2\text{H}_{2(g)} \longrightarrow 2\text{H}_2\text{O}_{(g)}$   
(C)  $\text{H}_{2(g)} + \text{F}_{2(g)} \longrightarrow 2\text{HF}_{(g)}$   
(D)  $\text{N}_{2(g)} + 3\text{H}_{2(g)} \longrightarrow 2\text{NH}_{3(g)}$
21. The volume of oxygen required for complete combustion of  $0.25 \text{ cm}^3$  of  $\text{CH}_4$  at S.T.P is \_\_\_\_\_  $\text{cm}^3$ .
- (A) 0.25                      (B) 0.5  
(C) 0.75                      (D) 1

#### 1.4 Dalton's atomic theory

22. Dalton assumed that \_\_\_\_\_ are the smallest particles of compound.
- (A) atoms                      (B) molecules  
(C) ions                        (D) elements

#### 1.5 Concepts of elements, atoms and molecules

23. Atoms have a mass of the order \_\_\_\_\_.
- (A)  $10^{-26} \text{ kg}$                 (B)  $10^{-15} \text{ kg}$   
(C)  $10^{-26} \text{ g}$                 (D)  $10^{-15} \text{ g}$
24. Atoms have a radius of the order \_\_\_\_\_.
- (A)  $10^{-26} \text{ m}$                 (B)  $10^{-15} \mu\text{m}$   
(C)  $10^{-15} \text{ mm}$                (D)  $10^{-15} \text{ m}$
25. A/an \_\_\_\_\_ is an aggregate of two or more atoms in definite composition, which are held together by chemical bonds.
- (A) ion                         (B) molecule  
(C) compound                (D) mixture

#### 1.6 Atomic and molecular masses

26. The unit of atomic mass 'amu' is replaced by \_\_\_\_\_.
- (A) u                          (B) mol                      (C) g                        (D) kg
27. Mole is the SI unit of \_\_\_\_\_.
- (A) volume  
(B) pressure  
(C) amount of substance  
(D) density
28. 1 amu is equal to \_\_\_\_\_.
- (A)  $\frac{1}{12}$  of C-12                (B)  $\frac{1}{14}$  of O-16  
(C) 1 g of  $\text{H}_2$                 (D)  $1.66 \times 10^{-23} \text{ kg}$
29. \_\_\_\_\_ is the sum of the atomic mass of all the atoms as given in the molecular formula of the substance.
- (A) Molecular mass  
(B) Atomic weight  
(C) Percentage weight  
(D) Percentage volume

#### 1.7 Avogadro's law, Avogadro's number and mole concept

30.  $N_A =$  \_\_\_\_\_ atoms  $\text{mol}^{-1}$ .
- (A)  $6.021 \times 10^{21}$                 (B)  $6.024 \times 10^{24}$   
(C)  $6.051 \times 10^{15}$                 (D)  $6.022 \times 10^{23}$
31. One \_\_\_\_\_ is the collection of  $6.022 \times 10^{23}$  atoms /molecules/ions.
- (A) kg                         (B) g  
(C) mole                        (D) cm
32. Avogadro's number is \_\_\_\_\_.
- (A) number of atoms in one gram of element  
(B) number of millilitres which one mole of a gaseous substance occupies at N.T.P.  
(C) number of molecules present in one gram molar mass of a substance  
(D) number of elements in one gram of compounds
33. 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
34. Volume occupied by 1 g molecular weight of any gas is called \_\_\_\_\_.
- (A) gram molecular volume  
(B) gram atomic volume  
(C) gram molecular weight  
(D) gram atomic weight