SAMPLE CONTENT

HOLISTIC

MHT-CET

ROADMAP TO SUCCESS

2024

- Based on latest paper pattern
- Quick Review
- Important Formulae & Shortcuts
- Subtopic wise segregation
- Classwork/Homework segregation
- Previous Years' Questions

CHEMISTRY (STD. XI)

Target Publications® Pvt. Ltd.

Chapter

1

Some Basic Concepts of Chemistry

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

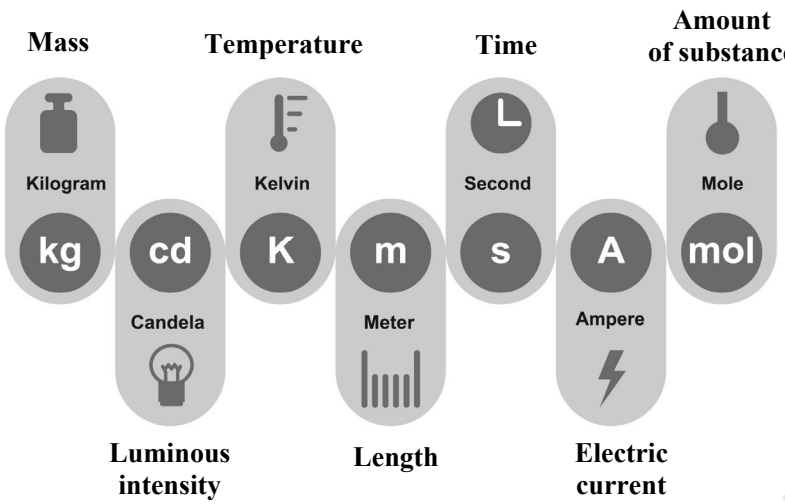
Homogeneous
Constituents are uniformly mixed throughout its bulk

Vinegar

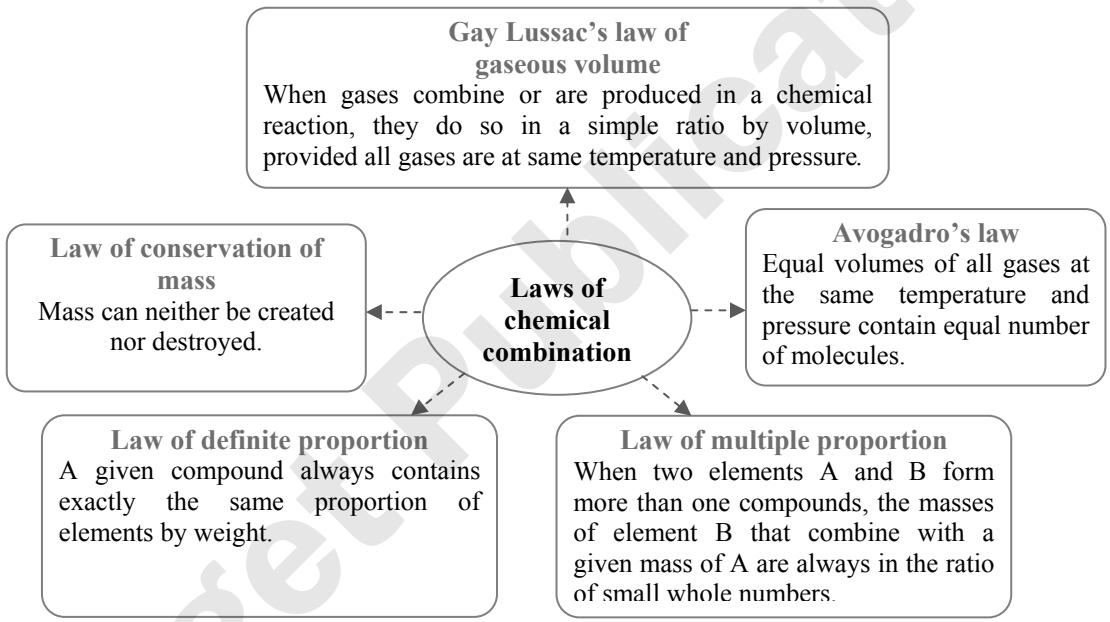
Heterogeneous
Constituents are not uniformly mixed throughout the bulk.

Tomato sauce

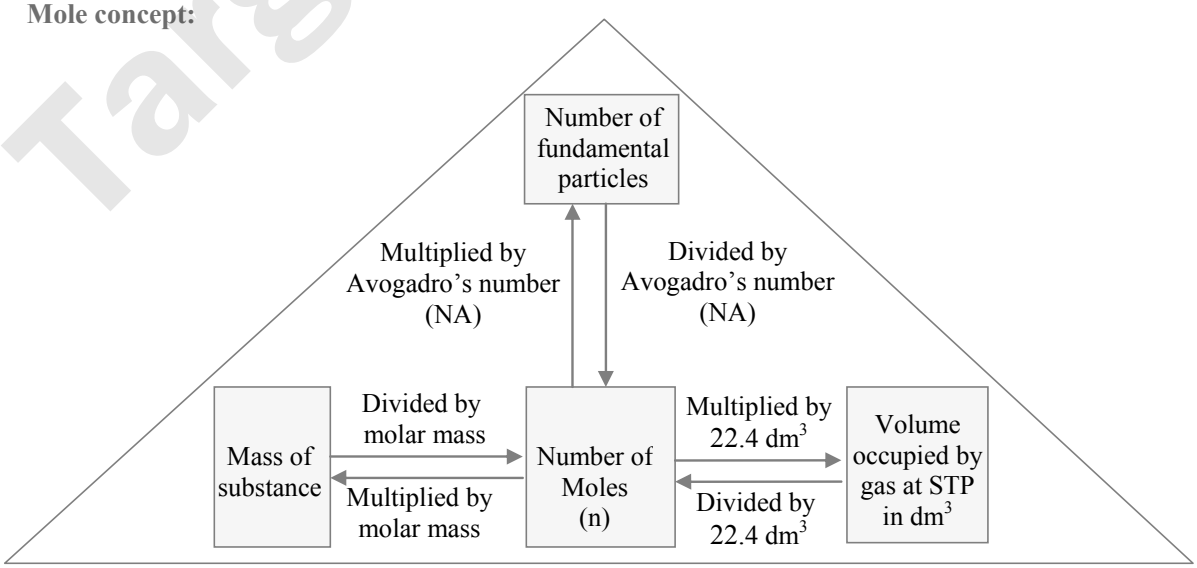
➢ **SI Fundamental units**



➢ **Laws of chemical combination:**



➢ **Mole concept:**



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 (°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}

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}

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