



INDIAN SCHOOL AL WADI AL KABIR



Class: XI	DEPARTMENT OF SCIENCE 2025– 2026 SUBJECT: CHEMISTRY	Date: 23/04/2025
Worksheet: 01	CHAPTER 1: SOME BASIC CONCEPTS OF CHEMISTRY	Note: A4 FILE FORMAT
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

I. MULTIPLE CHOICE QUESTIONS (1M)

- One atomic mass unit stands for
 - One ^{12}C atom
 - One H-atom
 - $1/12^{\text{th}}$ of the mass of H-atom
 - $1/12^{\text{th}}$ of the mass of ^{12}C -atom
- Which of the following statements indicates that law of multiple proportion is being followed?
 - Sample of water taken from any source will always have hydrogen and oxygen in the ratio 2:1.
 - Carbon forms two oxides namely CO_2 and CO , where masses of oxygen which combine with fixed mass of carbon are in the simple ratio 2:1.
 - A 10 g ribbon of Mg burns in oxygen and the entire magnesium converts to its oxide.
 - When two elements combine with a fixed mass of the third element, the ratio in which they do so is simple whole number ratio.
- Which of the following compounds has same empirical formula as that of glucose?
 - CH_3CHO
 - CH_3COOH
 - CH_3OH
 - C_2H_6
- One mole of NaCl contains 6.022×10^{23}
 - Ions
 - Atoms
 - Molecules
 - Formula Unit

5. Match the items in Column I and II.

Column I Physical quantity	Column II Unit
i. Molarity	a. gml^{-1}
ii. Mole fraction	b. Mol
iii. Mole	c. molkg^{-1}
iv. Molality	d. Unitless
	e. molL^{-1}

- a. i – d , ii – e , iii – a , iv – c
- b. i – b , ii – d , iii – e , iv – c
- c. i – e , ii – d , iii – b , iv – c
- d. i – c , ii – d , iii – b , iv – a

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

- a. $2\text{Mg(s)} + \text{O}_2(\text{g}) \rightarrow 2\text{MgO(s)}$
- b. $\text{C}_3\text{H}_8(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O(g)}$
- c. $\text{P}_4(\text{s}) + 5\text{O}_2(\text{g}) \rightarrow \text{P}_4\text{O}_{10}(\text{s})$
- d. $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O(g)}$

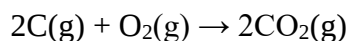
7. The empirical formula and molar mass of a compound are CH_2O and 180 grams respectively. What will be the molecular formula of the compound?

- a. $\text{C}_9\text{H}_{18}\text{O}_9$
- b. CH_2O
- c. $\text{C}_6\text{H}_{12}\text{O}_6$
- d. $\text{C}_2\text{H}_4\text{O}_2$

8. 10 mol of Zn is mixed with 10 mol of HCl. Calculate the number of moles of H_2 produced.

- a. 5 mol
- b. 10 mol
- c. 20 mol
- d. 2.5 mol

9. Carbon monoxide reacts with oxygen to form carbon dioxide.



100 ml of carbon monoxide is mixed with 75 ml of oxygen. What is the total volume of the gaseous mixture when the reaction is complete?

- a. 125 ml
- b. 100 ml
- c. 175 ml
- d. 350 ml

10. According to Avogadro's law ____

- a. $V \propto 1P$
- b. $V \propto n$
- c. $V \propto T$
- d. All the above

Assertion Reason type questions

Two statements are given - one labelled as **Assertion (A)** and the other labelled as **Reason (R)**.

Select the correct answer to these questions from the codes

- a. If both *Assertion* and *Reason* are correct and *Reason* is the correct explanation of *Assertion*.
- b. If both *Assertion* and *Reason* are correct but *Reason* is not the correct explanation of *Assertion*.
- c. If *Assertion* is correct and *Reason* is wrong.
- d. If *Assertion* is wrong and *Reason* is correct.

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

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

12. **Assertion (A):** 1 g atom of Sulphur contains Avogadro number of molecules.

Reason (R): Atomicity of S is eight.

13. **Assertion(A):** Molarity is the number of moles of solute present in 1 kg of the solvent.

Reason (R): Molarity is temperature dependent.

14. **Assertion(A):** Equal moles of different substances contain same number of constituent particles.

Reason(R): Equal weights of different substances contain the same number of constituent particles.

15. **Assertion (A):** Number of moles of H₂ in 0.224 L of hydrogen is 0.01 mole.

Reason (R): 22.4 L of H₂ at STP contains 6.023×10^{23} moles.

II. VERY SHORT ANSWER TYPE QUESTIONS(2M)

16. An organic compound contains 144g of carbon and 12g of hydrogen. If molar mass of this compound is 78 gmol^{-1} , calculate:

- i. Empirical formula
- ii. Molecular formula

17. A solution is prepared by dissolving 150g of NaCl in 900 g of water. Calculate the mole fraction of each component.

18. Prove that sum of all mole fractions of a solution is unity.

19. How many moles of N₂ are required to produce 85g of NH₃? Calculate its mass.

20. Calculate the number of H atoms in 3.42 g of C₁₂H₂₂O₁₁. (Atomic mass of H=1u, C= 12u, O= 16u)

III. SHORT ANSWER TYPE QUESTIONS (3M)

21. a. Define the term molarity.

b. A solution of fructose (Molar mass = 180 gmol^{-1}) is labelled as 10% by mass. What would be the molarity of the solution? Density of the solution is 1.8 gml^{-1} .

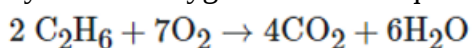
22. What do you mean by limiting reagent?
400 g of N_2 and 150 g of H_2 are mixed together to form NH_3 . Identify the limiting reagent and calculate the amount of NH_3 produced.
23. a. What will be the mass of one atom of C-12 in grams?
b. Give any one difference between molality and molarity.
24. a. How many moles of NaCl would be present in 100 mL of 0.02M NaCl solution?
b. If two elements can combine to form more than one compound, the masses of one element that combine with a fixed mass of the other element, are in whole-number ratio.
i. Which law is stated here?
ii. Give one example related to this law.
25. The reactant which is entirely consumed in the reaction is known as limiting reagent. In the reaction $2A + 4B \rightarrow 3C + 4D$, when 5 moles of A react with 6 moles of B, then
(i) which is the limiting reagent?
(ii) calculate the moles of C formed.

IV. CASE STUDY BASED QUESTIONS (4M)

26.

A mole is a collection of 6.022×10^{23} particles and the number of 6.022×10^{23} is called the Avogadro number. The mass of this number of atoms in an element is equal to its gram atomic mass and mass of this number of molecules in a compound is equal to its gram molecular mass. The volume occupied by this number of molecules of a gas at STP is 22.4L. When 6.022×10^{23} of a substance are dissolved in 1 L solution, it is known as 1 molar volume.

- a. How many litres of oxygen at STP is required to burn 60 g C_2H_6 according to the following equation?



(Atomic mass of C= 12u, H= 1u, O=16u)

- b. How many atoms of carbon are present in 0.1 mol of $C_{12}H_{22}O_{11}$?

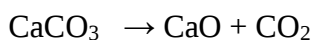
(Atomic mass of C= 12u, H= 1u, O=16u)

- c. What is the mass of 10 molecules of Naphthalene ($C_{10}H_8$)?

(Atomic mass of C= 12u, H= 1u, O=16u)

OR

- c. How many grams of Calcium oxide is obtained on heating 100 g of $CaCO_3(s)$ according to the equation given?



V. LONG ANSWER TYPE QUESTIONS (5M)

27. a. State law of Multiple proportion.
b. Calculate the mass percent of different elements present in Glucose. ($C_6H_{12}O_6$)
c. Calculate the mass of NaOH required to make 500 ml of 0.01 M aqueous solution. The molar mass of NaOH = 40 gmol^{-1} .

Answer Key

Q. No.	Answer															
I.	MULTIPLE CHOICE QUESTIONS (1M)															
1	d. $1/12^{\text{th}}$ of the mass of ^{12}C atom															
2	b. Carbon forms two oxides namely CO_2 and CO , where masses of oxygen which combine with fixed mass of carbon are in the simple ratio 2:1.															
3	b. CH_3COOH															
4	d. Formula Unit															
5	c. i – e , ii – d , iii – b , iv – c															
6	b. $\text{C}_3\text{H}_8(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$															
7	c. $\text{C}_6\text{H}_{12}\text{O}_6$															
8	a. 5 mol															
9	a. 125 ml															
10	b. $V \propto n$															
11	a. If both <i>Assertion</i> and <i>Reason</i> are correct and <i>Reason</i> is the correct explanation of <i>Assertion</i>															
12	d. If <i>Assertion</i> is wrong and <i>Reason</i> is correct.															
13	d. If <i>Assertion</i> is wrong and <i>Reason</i> is correct.															
14	c. If <i>Assertion</i> is correct and <i>Reason</i> is wrong.															
15	c. If <i>Assertion</i> is correct and <i>Reason</i> is wrong.															
II	VERY SHORT ANSWER TYPE QUESTIONS															
16	<table><tr><th>Element</th><th>Mass</th><th>Moles</th><th>Ratio</th><th>Simplest ratio</th></tr><tr><td>C</td><td>144</td><td>12</td><td>1</td><td>1</td></tr><tr><td>H</td><td>12</td><td>12</td><td>1</td><td>1</td></tr></table> Empirical formula = CH Empirical formula mass = 13 $n = 78/13 = 6$ Molecular formula = C_6H_6	Element	Mass	Moles	Ratio	Simplest ratio	C	144	12	1	1	H	12	12	1	1
Element	Mass	Moles	Ratio	Simplest ratio												
C	144	12	1	1												
H	12	12	1	1												
17	$n_{\text{NaCl}} = 150 / 58.5 = 2.56$ $n_{\text{H}_2\text{O}} = 900 / 18 = 50$ $\chi_{\text{NaCl}} = 2.56 / 2.56 + 50 = 0.0487$ $\chi_{\text{H}_2\text{O}} = 50 / 52.56 = 0.951$															
18	Mole fraction of A in solution $(x_A) = \frac{n_A}{n_A + n_B}$ Mole fraction of B in solution $(x_B) = \frac{n_B}{n_A + n_B}$ So, $x_A + x_B = \frac{n_A + n_B}{n_A + n_B} = 1$															

19	$\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$ No: of moles of $\text{NH}_3 = 85/17 = 5$ moles <table><tr><td></td><td>N_2</td><td>NH_3</td></tr><tr><td>As per eqn,</td><td>1 mol</td><td>2 mol</td></tr><tr><td>As per qsn,</td><td>?</td><td>5 moles</td></tr></table> Therefore no: of moles of $\text{N}_2 = 2.5$ moles		N_2	NH_3	As per eqn,	1 mol	2 mol	As per qsn,	?	5 moles									
	N_2	NH_3																	
As per eqn,	1 mol	2 mol																	
As per qsn,	?	5 moles																	
20	No of moles= 0.01 mol No of molecules = 6.022×10^{21} No of atoms = 132.484×10^{21} atoms																		
III	SHORT ANSWER TYPE QUESTIONS																		
21	a. Definition b. Formula Substitution Molarity = 1 M																		
22	Limiting reagent: The reactant, which gets consumed first, limits the amount of product formed and is, therefore, called the limiting reagent. $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$ No: of moles of $\text{N}_2 = 400/ 28 = 14.28$ mol No: of moles of $\text{H}_2 = 150 / 2 = 75$ mol <table><tr><td></td><td>N_2</td><td>H_2</td></tr><tr><td>As per eqn.</td><td>1</td><td>3</td></tr><tr><td>As per qsn,</td><td>14.28</td><td>?</td></tr></table> No: of moles of H_2 required for 14.28 moles of $\text{N}_2 = 42.84$ mol Therefore, H_2 is excess reagent i.e N_2 is limiting reagent. <table><tr><td></td><td>N_2</td><td>NH_3</td></tr><tr><td>As per eqn.</td><td>1</td><td>2</td></tr><tr><td>As per qsn,</td><td>14.28</td><td>?</td></tr></table> Therefore no: of moles of $\text{NH}_3 = 28.56$ mol Mass of $\text{NH}_3 = 28.56 \times 17 = 485.52$ g		N_2	H_2	As per eqn.	1	3	As per qsn,	14.28	?		N_2	NH_3	As per eqn.	1	2	As per qsn,	14.28	?
	N_2	H_2																	
As per eqn.	1	3																	
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	N_2	NH_3																	
As per eqn.	1	2																	
As per qsn,	14.28	?																	
23	a. $\frac{1}{6.022 \times 10^{23}} = \frac{m}{12}$ $m = \frac{12}{6.022 \times 10^{23}}$ $m = 2 \times 10^{-23} \text{ g}$																		

	b. Molality is the number of moles of solute per thousand grams of solvent whereas molarity is the number of moles of solute dissolved in one litre of solution. Molality is independent of temperature whereas molarity changes with change in temperature as volume changes with temperature. (Any one)
24	a. $M = n / V$ in L ; $n = 0.002$ moles b. i. Law of multiple proportion ii. Any suitable example
25	i. B is the Limiting reagent. ii. 4.5 moles of C.
IV	PASSAGE BASED QUESTIONS
26	a. 60 g of $C_2H_6 = 2$ moles 2 moles of C_2H_6 requires 7 moles of $O_2 = 7 \times 22.4 = 156.8$ L b. 0.1 mole of $C_{12}H_{22}O_{11}$ contains 6.022×10^{22} molecules hence No of C atoms in 0.1 mole = $12 \times 6.022 \times 10^{22}$ = 72.264×10^{22} C atoms c. No: of moles = $10 / 6.022 \times 10^{23}$ No: of moles = mass / 128 Mass = 213.33×10^{-23} g OR c. 100 g of $CaCO_3 = 1$ mole 1 mole of $CaO = 56$g of CaO
V	LONG ANSWER TYPE QUESTION
27	a. If two elements can combine to form more than one compound, the masses of one element that combine with a fixed mass of the other element, are in the ratio of small whole numbers. b. C = 40% H = 6.66% O = 53.33% c. No: of moles = mass / molar mass / Vol of solution in L $0.01 = \text{mass} / 40 / 0.5$ Mass = 0.2 g

Prepared by:
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