Chapter 1. Some Basic Cioncepts of Chemistry

Question-1

Classify the following as pure substances or mixtures separate to pure substances into elements and compounds and divide the mixtures into homogeneous and heterogeneous categories:
(i) Bronze (ii) Smoke (iii) Pencil lead (iv) Antenna rod

Solution:

(i) Bronze = a mixture of Cu & Sn - Homogenous mixture.
(ii) Dust = a mixture of carbon particle and air - Heterogenous mixture.
(iii) Pencil lead = Pure element - Graphite.
(iv) Antenna rod = Aluminium.

Question-2

Calculate number of moles for the following ?
(i) 360 gms of H_2O (ii) 5.6 gms of Nitrogen (iii) 4 gms of NaOH.

Solution:

(i) No. of moles of H_2O = $\frac{wt}{mwt} = \frac{360}{18} = 20$;
(ii) Number of moles of N_2 = $\frac{5.6}{28} = 0.2$;
(iii) Number of moles of NaOH = $\frac{4}{40} = 0.1$.

Question-3

Calculate the number of moles of H_2SO_4 present in 50 ml of 0.2m H_2SO_4.

Solution:

0.2m means it contains 0.2 moles per litre.
1000 ml contains 0.2 moles at H_2SO_4
$\therefore$50 ml contains = $\frac{0.2}{1000} \times 50 = \frac{2\times10^{-1}\times50}{10^3} = 10\times10^{-2} = 0.01$ moles.

Question-4

What is molarity of a solution contain 5.84 gms of NaCl in 200 ml of solution?

Solution:

Number of moles of NaCl = $\frac{wt}{m.wt} = \frac{5.84}{58.48} = 0.1$

Molarity = $\frac{moles}{litre}$

Volume of solution in litre = $\frac{200}{1000} = 0.2$

$\therefore$ Molarity of the solution = $\frac{0.1}{0.2} = \frac{1 \times 10^{-1}}{2 \times 10^{-1}} = 0.5m.$

Question-5

What is weight of NaOH present in 250 cc of a 2M solution?

Solution:

2M of NaOH solution means it contains 2 moles of NaOH per litre

1000ml = 2 moles of NaOH

Number of moles of NaOH present in 250cc = $\frac{2}{1000} \times 250 = \frac{2}{4} = 0.5$

Mole = $\frac{wt}{m.wt}$; wt = mole x m.wt

$\therefore$ Weight of NaOH present in 250 ml of solution = 0.5 x 40 = 20 gm.

/ Through Formula /

Weight of substance in 1 lit solution = Molarity x m.wt

Weight of NaOH present in 1 lit solution $\downarrow$ = 2 x 40 gms

$\therefore$ Weight of NaOH present in 250cc solution = $\frac{2 \times 40 \times 250}{1000}$ = 20 gms.

Question-6

In a reaction vessel 0.980 gm of H_2SO_4 is required to be added for completing the reaction. How many millilitre of 0.05 M H_2SO_4 solution should be added for this requirement?

Solution:

0.05 M H_2SO_4 means 0.05 moles of H_2SO_4 pressure in 1000 ml;

1 litre of 0.05 m H_2SO_4 contains = molarity x m.wt = 0.05 x 98 = 5×10^{-2} x98 = 4.9 gms of H_2SO_4

$\therefore$1 ml contains = $\frac{4.9}{1000}$ = 4.9×10^{-3} gms of H_2SO_4

4.9×10^{-3} of gms of H_2SO_4 = 1 ml of solution

$\therefore$0.980 gms of H_2SO_4 = $\frac{1}{4.9 \times 10^{-3}} \times 0.980 = \frac{98 \times 10^{-2}}{49 \times 10^{-4}} = 2 \times 10^2 = 200$ ml.

Through formula :

Wt. of H_2SO_4 present in 1 lt = Molarity x m.wt

Wt.of H_2SO_4 present in 1 lt of 0.05M = 0.05 x 98 gm = $98 \times 5 \times 10^{-2}$ gms = 4.9 gms.

$\therefore$4.9 gms is present in 1000 ml

Hence, 0.980 gms is present in $\frac{1000}{4.9} \times 0.98$

$$= \frac{1000 \times 98 \times 10^{-2}}{49 \times 10^{-1}}$$

= 200 ml.

Question-7

How much AgCl will be formed by adding 200ml of 5M HCl to the solution containing 1.7 gms of Ag No_3?

Solution:

$AgNO3 + HCl \rightarrow AgCl \downarrow + HNO3$

200 ml of 5M HCl contains 1.7g of AgNO3

$\therefore$1000 ml of 1M HCl will contain $-\frac{1.7 \times 1000}{200 \times 5}$ = 1.7g

Hence 1M solution of HCl contains 1.7 g of AgNO3.

Question-8

Calculate the weight of HCl in 10 ml of con. HCl of density 1.2 gm L^{-1} container 35% HCl by weight. What is the molarity of the solution?

Solution:

35% HCl means 35 gm of HCl are present in 100 gms of HCl solution.

$\therefore$ Volume of 100 gms of given HCl solution = $\frac{\text{mass}}{\text{density}} = \frac{100}{1.2} = 83.3$ ml

83.3 ml of con. HCl contains 35 gms of HCl

$\therefore$ 10 ml of con. HCl contains $\frac{35}{83.3} \times 10 = \frac{350}{83.3} = 4.20$ gms of HCl.

Molarity of the solution = $\left(\frac{wt}{mwt}\right) \times \frac{1000}{10}$ (in litre)

$= \frac{4.2}{36.45} \times \frac{1000}{10}$

$= \frac{420}{36.45} = 1.15$ M.

Question-9

The molarity of con. HCl is 1.15M; what volume of con. HCl is required to make 1.00 of 0.1M HCl.

Solution:

Known Unknown

$V_1 M_1 = V_2 M_2$

1000 ml x 0.1M = V_2 x 1.15M

$V_2 = \frac{1000 \times 0.1}{1.15}$ ml = $\frac{100}{1.15} = \frac{100 \times 10^2}{115} = 86.9$ ml.

Question-10

Aluminium and Sulphuric acid react according to the reaction :

$$2Al+3H_2SO_{4(aq)} \rightarrow Al_2(SO_4)_{3(aq)}+3H_2(g)$$

If 0.5 mol Al are added to H_2SO_4 solution containing 0.2 mole H_2SO_4 , how many moles of H_2 are produced.

Solution:

As per equation, 2 moles Al reacts with 3 moles of H_2SO_4 to produce 3 mole of H_2.

$\therefore$ 0.5 ml Al reacts with 3 mole of H_2SO_4 $\frac{3}{0.5}$ moles of H_2.

$\therefore$ 0.5 ml of Al reacts with 0.2 mole of H_2SO_4 = $\frac{3}{0.5} \times \frac{1}{3} \times 0.2$ mole of H_2

= $\frac{0.2}{0.5}$ moles of H_2

= $\frac{2}{5}$ = 0.4 moles of H_2.

CBSE Class 11 Chemistry

Important Questions

Chapter 1

Some Basic Concepts of Chemistry

1 Marks Questions

1.What is chemistry?

Ans: Chemistry is the branch of science that studies the composition, properties and interaction of matter.

2.How has chemistry contributed towards nation's development?

Ans: chemical principles are important in diverse areas such as weather patterns, functioning of brain, operation of a computer, chemical industries, manufacturing , fertilizers, alkalis, acids, salts, dyes, polymers, drugs, soaps, detergents, metals, alloys, contribute in a big way to national economy.

3.Differentiate solids, liquids & gases in terms of volume & shapes.

Ans:

Property	**Solids**	**Liquids**	**Gases**
1. Volume	Definite	Definite	**Not definite**
2. Shape	**Fixed**	**Not fixed, take the shape of container,**	**Not fixed, takes the shape of the container**

4.Name the different methods that can be used for separation of components of a mixture. .

Ans: The components of a mixture can be separated by physical methods like handpicking, filtrations, crystallization, distillation etc.

5.Classify following as pure substances and mixtures – Air, glucose, gold, odium and milk.

Ans:

Pure Substances	Mixtures
Glucose	Air
Gold	Milk
Sodium	

6.What is the difference between molecules and compounds? Give examples of each.

Ans: Molecules consist of different atoms or same atoms. e.g. molecule of hydrogen contains two atoms of hydrogen where as molecule of water contain two atoms of hydrogen and one of oxygen.

Compound is formed when two or more than two different atoms combine in fire propo e.g. water –rtion carbondioxide, sugar etc.

7. How can we separate the components of a compound?

Ans: The constituents of a compound can not be separated by physical methods. They can only be separate by chemical methods.

8.How are physical properties different from chemical properties?

Ans: Physical properties are those properties which can be measured or observed without changing the identity or the composition of the substance whereas the measurement of chemical properties require a chemical change to occur e.g. colour, odour etc are physical properties and combustion, basicity etc are chemical properties.

9.What are the two different system of measurement?

Ans: The different system of measurement are English system and the metric system.

10.What is the SI unit of density?

Ans: The SI Unit of density is Kg m^{-3} or kg/m^3

11.What are the reference points in thermometer with Celsius scale?

Ans: The thermometers with Celsius scale are calibrated form 0^o to 100^o where there two temperatures are the freezing and boiling of water.

12.What is the SI unit of volume? What is the other common unit which in not an SI unit of volume.

Ans: The SI unit of volume is m^3 whereas litre (L) is the common unit which is not an SI unit.

13.What is the difference between precision and accuracy?

Ans: Precision means the closeness of various measurements for the same quantity. Accuracy is the agreement of a particular value to the true value of the result.

14.What do you understand by significant figures?

Ans: Significant figures are meaningful digits which are known with certainty. The uncertainty in experimental or the calculated value is indicated by mentioning the number of significant figures.

15.State law of definite proportions.

Ans: Law of definite proportions states that a given compound always contains exactly the same proportion of elements by weight.

16.State Avogadro's law.

Ans: According to Avogadro's law, equal volumes of gases at the same temperature and pressure should contain equal number of molecules.

17.Define one atomic mass unit (amu).

Ans: One atomic mass unit (amu) is defined as a mass exactly equal to one – twelfth the mass of one carbon – 12 atom.

18.What is formula mass?

Ans: When a substance does not contain discrete molecules as their constituent units and have a three dimensional structure, formula mass is used to calculate molecular mass which is sum of all the atomic masses of atom present in the formula.

19.What is the value of one mole?

Ans:1mole = 6.022×10^{23} atoms/ ions / entities

20.At NTP, what will be the volume of molecules of 6.022×10^{23} H_2?

Ans: 22.4 Litres.

21.Calculate the number of molecules present in 0.5 moles of CO_2?

Ans: The number of molecules present in 0.5 moles of $C0_2$ is

$6.022 \times 10^{23} \times 0.5 = 3.011 \times 10^{23}$.

22. 1L of a gas at STP weighs 1.97g. What is molecular mass?

Ans: 22.4 L of the gas at STP will weigh

$= 1.97 \times 22.4 = 44.1g$

i.e. molecular mass = 44.1

23.What is stoichiometry?

Ans: Stoichimetry deals with the calculations of masses of reactants and products involved in a chemical reactions.

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24. The substance which gets used up in any reaction is called ----------

Ans: The substance that gets used up in any reaction is called limiting reagent.

25.What is 1molal solution?

Ans: one molal solution is solution in which one mole of solute is present in 1000g of solvent.

CBSE Class 12 Chemistry

Important Questions

Chapter 1

Some Basic Concepts of Chemistry

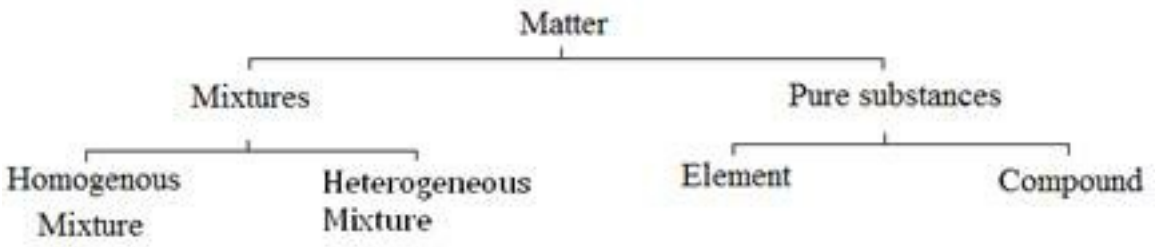
2 Marks Questions

1.How can we say that sugar is solid and water is liquid?

Ans: Sugar has close packing of constituent particles, have its own volume and shape therefore, it can be said to be solid whereas in water the constituent particles are not as closely packed as in solid. It has definite volume but not definite shape. Therefore it is a liquid.

2.How is matter classified at macroscopic level?

Ans: Macroscopic classification of matter –



3.Classify following substances as element, compounds and mixtures – water, tea, silver, steel, carbondioxide and platinum

Ans:

Compounds	Elements	Mixtures
Water	Silver	Tea
Carbondioxide	Platinum	Steel

4.Write seven fundamental quantities & their units.

Ans:

Physical Quantity	SI unit
1. Length (l)	Metre (m)
2. Mass (m)	Kilogram (kg)
3. Time (t)	Second (s)
4. Electric Current (I)	Ampere (A)
5. Thermodynamic Temperature (T)	Kelvin (K)
6. Amount of substance (n)	Mole (mol)
7. Luminous Intensity (I)	Candela (Cd)

5.What is the difference between mass & weight? How is mass measured in laboratory?

Ans: Mass of a substance is the amount of matter present in it while weight is the force exerted by gravity on an object the mass of a substance is determined with the help of an analytical balance in laboratory.

6.How is volume measured in laboratory? Convent 0.5L into ml and $30cm^3$ to dm^3

Ans: In the laboratory volume of a liquid can be measured by using graduated cylinder, burette, pipette etc.

1L = 1000 ml

1000cm3 = $1dm^3$

0.5L = 500 ml

$30cm^3 = \frac{1}{100\cancel{0}} \times 3\cancel{0} dm^3$

= $0.03dm^3$

7.Convert 35^0C to ^oF & K.

Ans.^oF

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

$$^\circ F = \frac{9}{5}(35) + 32$$

$$= 63 + 32 = 95^\circ F$$

K

$$K = ^\circ C + 273.15$$

$$= 35 + 273.15$$

$$= 308.15K$$

8.What does the following prefixes stand for –

(a) pico

(b) nano

(c) centi

(d) deci

Ans: Pico = 10^{-12}

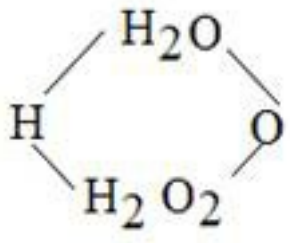
nano = 10^{-9}

centi = 10^{-2}

deci = 10^{-1}

9.Explain law of multiple proportions with an example.

Ans: The law of multiple proportions rays that if two elements can combine to form more than one compound, the masses of one element that combine with a fixed mass of other element are in a ratio of small whole numbers. e.g. hydrogen and oxygen can combine to form water as well as hydrogen peroxide.



Here, the masses of oxygen (16g & 32g) which combine with a fixed mass of hydrogen (2g) bear a simple ratio i.e., 16:32 = 1:2.

10.Write Postulates of Dalton's atomic theory.

Ans. Postulates of Dalton's atomic theory –

1. Matter consists of indivisible atoms.

2. All the atoms of a given element have identical properties including atomic mass. Atoms of different element differ in mass.

3. Compounds are formed when atoms of different elements combine in a fixed ratio.

4. Chemical reaction involves reorganization of atoms. These are neither created nor destroyed

11.Calculate molecular mass of –

C_2H_6, $C_{12}H_{22}O_{11}$, H_2SO_4, H_3PO_4

Ans: $C_2H_6 = (2\times12) + (6\times1) = 30$

$C_{12}H_{22}O_{11} = (12\times12) + (22\times1) + (11\times16) = 342$

$H_2SO_4 = (2\times1) + 32 + (4\times16) = 98$

$H_3PO_4 = (1\times3) + 31 + (4\times16) = 98$

12. Give one example each of a molecule in which empirical formula

and molecular formula are (i) same (ii) Different.

Ans:(i) Same molecular formula and empirical formula. Carbon dioxide, both is CO_2.

(ii) When molecular formula and empirical formula are different –

Hydrogen peroxide: molecular formula is H_2O_2 and empirical formula is HO

13.Calculate the number of moles in the following masses –

(i) 7.85g of Fe

(ii) 7.9mg of Ca

Ans. (i) 7.85g of Fe

56g of Fe contains 6.022×10^{23} atoms = 1mole

56g of Fe = 1mole

7.85g of Fe = $\frac{1}{56}\times7.85$ = 0.14moles

(ii)40g of Ca = 40×10^3 mg of Ca

40g of Ca = 1mole

Or 4×10^4 mg of Ca = 1mole

7.9mg of Ca = $\frac{7.9}{4\times10^4}$

$=1.97\times10^{-4} moles$

14.How much potassium chlorate should be heated to produce 2.24L of oxygen at NTP?

Ans: $2KClO_3$ à $2KCl + 3O_2$

2moles 3moles

$2(39 + 35.5 + 3 \times 16)$ $22.4 \times 3L$

= 245g = 67.2L

67.2L of oxygen is produced from 245g of $KClO_3$

2.24L of oxygen is produced from = $\frac{245}{67.2}\times2.24$

= 8.17g of $KClO_3$

15.Write an expression for molarity and molality of a solution.

Ans: $\text{Molarity} = \frac{\text{number of moles of solute}}{\text{Volume of solution in Litres}}$

$\text{Molality} = \frac{\text{number of moles of solute}}{\text{Mass of solvent in kg}}$

16.Calculate the weight of lime (CaO) obtained by heating 2000kg of 95% pure lime stone ($CaCO_3$)

Ans:100kg impure sample has pure $CaCO_3$ = 95

= 95kg

$\therefore$ 200kg impure sample has pure $CaCO_3$ = $\frac{95 \times 200}{100}$

= 190kg

$CaCO_3$ à CaO + CO_2

Since 100kg $CaCO_3$ gives CaO = 56kg

190kg $CaCO_3$ will give CaO = $\frac{56 \times 190}{100}$

= 106.4kg

17. 4 litres of water are added to 2L of 6 molar HCl solutions.What is the molarity of resulting solution?

Ans. Initial volume, V_1 = 2L

Final volume, V_2 = 4L + 2L = 6L

Initial molarity, M_1 = 6M

Final molarity = M_2

$M_1V_1 = M_2V_2$

$$6M \times 2L = M_2 \times 6L$$

$$M_2 = \frac{6M \times 2L}{6L} = 2M$$

Thus the resulting solution is 2M HCl.

18.What volume of 10M HCl and 3M HCl should be mixed to obtain 1L of 6M HCl solution?

Ans: Let the required volume of 10M HCl be V liters.

Then, the required volume of 3M HCl be (1 – V) Liters.

$M_1V_1 + M_2V_2 = M_3V_3$

$$10 \times V + 3 \times (1 - V) = 6 \times 1$$

$$10V + 3 - 3V = 6$$

$$7V = 3$$

$$V = \frac{3}{7} = 0.428L = 428mL.$$

Then the volume of 10M HCl required = 428mL

& volume of 3M HCl required = 1000mL – 428mL = 572mL

CBSE Class 12 Chemistry

Important Questions

Chapter 1

Some Basic Concepts of Chemistry

3 Marks Questions

1.How many significant figures are present in

(a) 4.01 $\times 10^2$

(b) 8.256

(c) 100

Ans:(a) 4.01 $\times 10^2$ – Three

(b) 8.256 – Four

(c) 100 – One

2.Vitamin C is essential for the prevention of scurvy. Combustion of 0.2000g of vitamin C gives 0.2998g of CO_2 and 0.819g of H_2O. What is the empirical formula of vitamin C?

Ans: Percentage of carbon = $\frac{12}{44} \times 0.02998 \times \frac{100}{0.2} = 47.69$

Percentage of Hydrogen $= \frac{2}{18} \times 0.0819 \times \frac{100}{0.2} = 4.55$

Percentage of oxygen $= 100 - (47.69 + 4.55) = 47.76$

Element	**%**	**Atomic Mass**	**Relative no. of atoms**	**Simplest Ratio**
C	47.69	12	$\frac{47.69}{12} = 3.97$	$\frac{3.97}{2.98} = 1.33$

H	4.55	1	$\frac{4.55}{1}=4.55$	$\frac{4.55}{2.98}=1.5$
O	47.76	16	$\frac{47.76}{15}=2.98$	$\frac{2.98}{2.98}=1$

Empirical formula = $C_{1.33}\,H_{1.5}\,O$,

= $C_8H_9O_6$

Some Basic Concepts of Chemistry

Short Answer Type Questions

1. What will be the mass of one atom of C-12 in grams?
2. How many significant figures should be present in the answer of the following calculations?
   $$\frac{2.5 \times 1.25 \times 3.5}{2.01}$$
3. What is the symbol for SI unit of mole? How is the mole defined?
4. What is the difference between molality and molarity?
5. Calculate the mass percent of calcium, phosphorus and oxygen in calcium phosphate $Ca_3(PO_4)_2$.
6. 45.4 L of dinitrogen reacted with 22.7 L of dioxygen and 45.4 L of nitrous oxide was formed. The reaction is given below:
   $2N_2(g) + O_2(g) \rightarrow 2N_2O(g)$
   Which law is being obeyed in this experiment? Write the statement of the law?
7. 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.
   - (a) Is this statement true?
   - (b) If yes, according to which law?
   - (c) Give one example related to this law.
8. Calculate the average atomic mass of hydrogen using the following data :

Isotope	% Natural abundance	Molar mass
^1H	99.985	1
^2H	0.015	2

9. Hydrogen gas is prepared in the laboratory by reacting dilute HCl with granulated zinc. Following reaction takes place.
   $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
   Calculate the volume of hydrogen gas liberated at STP when 32.65 g of zinc reacts with HCl. 1 mol of a gas occupies 22.7 L volume at STP; atomic mass of Zn = 65.3 u.

10. The density of 3 molal solution of NaOH is 1.110 g mL^{-1} . Calculate the molarity of the solution.
11. Volume of a solution changes with change in temperature, then, will the molality of the solution be affected by temperature? Give reason for your answer.
12. If 4 g of NaOH dissolves in 36 g of H_2O, calculate the mole fraction of each component in the solution. Also, determine the molarity of solution (specific gravity of solution is 1g mL^{-1}).
13. The reactant which is entirely consumed in reaction is known as limiting reagent. In the reaction 2A + 4B → 3C + 4D, when 5 moles of A react with 6 moles of B, then
    - (i) which is the limiting reagent?
    - (ii) calculate the amount of C formed?

Matching Type Questions

1. Match the following:

(i)	88 g of CO_2	(a)	0.25 mol
(ii)	6.022×10^{23} molecules of H_2O	(b)	2 mol
(iii)	5.6 litres of O_2 at STP	(c)	1 mol
(iv)	96 g of O_2	(d)	6.022×10^{23} molecules
(v)	1 mol of any gas	(e)	3 mol

2. Match the following physical quantities with units

	Physical quantity		**Unit**
(i)	Molarity	(a)	g mL^{-1}
(ii)	Mole fraction	(b)	mol
(iii)	Mole	(c)	Pascal
(iv)	Molality	(d)	Unitless
(v)	Pressure	(e)	mol L^{-1}
(vi)	Luminous intensity	(f)	Candela
(vii)	Density	(g)	mol kg^{-1}
(viii)	Mass	(h)	Nm^{-1}
		(i)	kg

Assertion and Reason Type Questions

In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below each question.

1. 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.
   - (i) Both A and R are true and R is the correct explanation of A.
   - (ii) A is true but R is false.
   - (iii) A is false but R is true.
   - (iv) Both A and R are false.

2. Assertion (A) : One atomic mass unit is defined as one twelfth of the mass of one carbon-12 atom.
   Reason (R) : Carbon-12 isotope is the most abundunt isotope of carbon and has been chosen as standard.
   - (i) Both A and R are true and R is the correct explanation of A.
   - (ii) Both A and R are true but R is not the correct explanation of A.
   - (iii) A is true but R is false.
   - (iv) Both A and R are false.

3. Assertion (A) : Significant figures for 0.200 is 3 where as for 200 it is 1.
   Reason (R) : Zero at the end or right of a number are significant provided they are not on the right side of the decimal point.
   - (i) Both A and R are true and R is correct explanation of A.
   - (ii) Both A and R are true but R is not a correct explanation of A.
   - (iii) A is true but R is false.

- (iv) Both A and R are false.

4. Assertion (A) : Combustion of 16 g of methane gives 18 g of water.
   Reason (R) : In the combustion of methane, water is one of the products.
   - (i) Both A and R are true but R is not the correct explanation of A.
   - (ii) A is true but R is false.
   - (iii) A is false but R is true.
   - (iv) Both A and R are false.

Long Answer Type Questions

1. A vessel contains 1.6 g of dioxygen at STP (273.15K, 1 atm pressure). The gas is now transferred to another vessel at constant temperature, where pressure becomes half of the original pressure. Calculate
   - (i) volume of the new vessel.
   - (ii) number of molecules of dioxygen.

2. Calcium carbonate reacts with aqueous HCl to give $CaCl_2$ and CO_2 according to the reaction given below:
   $CaCO_3$ (s) + 2HCl (aq) → $CaCl_2$(aq) + CO_2(g) + H_2O(l)
   What mass of $CaCl_2$ will be formed when 250 mL of 0.76 M HCl reacts with 1000 g of $CaCO_3$? Name the limiting reagent. Calculate the number of moles of $CaCl_2$ formed in the reaction.
3. Define the law of multiple proportions. Explain it with two examples. How does this law point to the existance of atoms?
4. A box contains some identical red coloured balls, labelled as A, each weighing 2 grams. Another box contains identical blue coloured balls, labelled as B, each weighing 5 grams. Consider the combinations AB, AB_2, A_2B and A_2B_3 and show that law of multiple proportions is applicable.