6. COMPOSITION OF MATTER

Q 1) Choose the appropriate option and rewrite the following statements.

a. The intermolecular force is ..... in the particles of solid.

i. minimum

ii. Moderate

iii. Maximum

iv. Indefinite

Ans. The intermolecular force is Maximum in the particles of solid.

b. Solids retain their volume even when external pressure is applied. This property is called .....

i. plasticity

ii. Incompressibility

iii. Fluidity

iv. Elasticity

Ans. Solids retain their volume even when external pressure is applied. This property is called incompressibility

c. Matter is classified into the type's mixture, compound and element, by applying the criterion .....

i. states of matter

ii. Phases of matters

iii. Chemical composition of matter

iv. All of these

Ans. Matter is classified into the type's mixture, compound and element, by applying the criterion Chemical composition of matter

d. Matter that contain two or more constituent substances is called .....

i. mixture ii. Compound

iii. Element iv. Metalloid

Ans. Matter that contain two or more constituent substances is called mixture

e. Milk is an example of type of matter called .....

i. mixture ii. Homogeneous

iii. Heterogeneous mixture iv. Suspension

Ans. Milk is an example of type of matter called Heterogeneous mixture

f. Water, mercury and bromine are similar to each other, because three are .....

i. liquids ii. Compounds

iii. Nonmetals iv. Elements

Ans. Water, mercury and bromine are similar to each other, because there are liquids

g. Valency of carbon is 4 and that of oxygen is 2. From this, we understand that there are ..... chemical bond/bonds between the carbon atom and one oxygen atom in the compound- carbon dioxide.

i. 1 ii. 2

iii. 3 iv. 4

Ans. Valency of carbon is 4 and that of oxygen is 2. From this, we understand that there are 2 chemical bond/ bonds between the carbon atom and one oxygen atom in the compound- carbon dioxide.

Q 2) Identify the odd term out and explain.

a. Gold, silver, copper, brass.

Ans. Brass (It is an alloy, others are elements)

b. Hydrogen, hydrogen peroxide, Carbon dixodide, water vapour.

Ans. Hydrogen (It is element, others are inorganic compounds)

c. Milk, lemon juice, carbon, steel.

Ans. Carbon (It is an element, others are the mixture of various elements)

d. Water, mercury, bromine, petrol.

Ans. Petrol (It is an inorganic compound while others are organic compound)

e. Sugar, salt, baking soda, blue vitriol.

Ans. Sugar (It is an organic compound others are inorganic compounds)

f. Hydrogen, sodium, potassium, carbon.

Ans. Hydrogen (It is a gas, others are monovalent elements)

Q 3) Answer the following question.

a. Plants synthesize glucose in sunlight with the help of chlorophyll from carbon dioxide and water and give away oxygen. Identify the four compounds in this process and name their types.

Ans.

$$\underset{\text{Carbon dioxide}}{6CO_2} + \underset{\text{Water}}{6H_2O} \xrightarrow[Chlorophyll]{light} \underset{\text{Glucose}}{C_6H_{12}O_6} + \underset{\text{Oxygen}}{6O_2}$$

Four compounds in photosynthesis are chlorophyll, carbon dioxide, glucose and water.

Chlorophyll type: complex compounds.

Carbon dioxide type: molecular compound.

Glucose type: Organic compounds.

Water type: Molecular compound.

b. In one sample of brass, the following ingredients were found: copper (70 %) and zinc (30 %). Identify the solvent, solute and solution from these.

Ans. In one sample of brass – copper (70%) and (Zinc 30%) were found. In this copper is solvent as it is present in largest proportion and Zinc is solute as it is present in lesser proportion. The solution is brass as it is a mixture of two metals.

c. Sea water tastes salty due to the dissolved salt. The salinity (the proportion of salts in water) of some water bodies Lonar Lake – 7.9%, Pacific Ocean 3.5%, Mediterranean Sea – 3.8 %, Dead Sea – 33.7%. Explain two characteristics of mixtures from the above information.

Ans. The salinity is different for different water bodies as given in the information. Sea water is a mixture as it contains many salts and it tastes salty due to dissolved salts. In mixture, the proportion of the constituents is not fixed and the constituents retain their individual properties.

Q 4) Give two examples each

a. Liquid element

Ans. Bromine (Br_2) Mercury (H_g)

b. Gaseous element

Ans. Hydrogen (H_2), Oxygen (O_2)

c. Solid element

Ans. Copper (Cu), Silver(Ag)

d. Homogeneous mixture

Ans. Sea water, mouth wash

e. Colloid

Ans. Milk, shaving cream

f. Organic Compound

Ans. Sugar, camphor

g. Complex compound

Ans. Chlorophyll, haemoglobin

h. Inorganic compound

Ans. Common salt, soda

i. Metalloid

Ans. Arsenic, silicon

j. Element with valency 1

Ans. Hydrogen, sodium

k. Element with valency 2

Ans. Oxygen, magnesium

Q 5) Write the names and symbols of the constituent elements and identify their valencies from the molecular formulae given below.

KCl, HBr, $MgBr_2$, K_2O, NaH, $CaCl_2$, CCl_4, HI, H_2S, Na_2S, FeS, $BaCl_2$

Ans.

Molecular Formula	Symbol	Name	Valency
KCl	K Cl	Potassium Chlorine	1 1
HBr	H Br	Hydrogen Bromine	1 1
$MgBr_2$	Mg Br	Magnesium Bromine	2 1

K_2O	K	Potassium	1
	O	Oxygen	2
NaH	Na	Sodium	1
	H	Hydrogen	1
$CaCl_2$	Ca	Calcium	2
	Cl	Chlorine	1
CCl_4	C	Carbon	4
	Cl	Chlorine	1
HI	H	Hydrogen	1
	I	Iodine	1
H_2S	H	Hydrogen	1
	S	Sulphur	2
Na_2S	Na	Sodium	1
	S	Sulphur	2
Fes	Fe	Iron	2
	S	Sulphur	2
$BaCl_2$	Ba	Barium	2
	Cl	Chorine	1

Q 6) Chemical composition of some matter is given in the following table. Identify the main type of matter from their.

Name of matter	Chemical composition	
Sea water	H_2O+NaCl+ $MgCl_2$+….	
Distilled water	H_2O	
Hydrogen gas filled in a ballon	H_2	
The gas in LPG Cylinder	C_4H_{10} + C_3H_8	
Baking soda	$NaHCO_3$	
Pure gold	Au	
The gas in oxygen cylinder	O_2	
Bronze	Cu + Sn	
Diamond	C	
Heated white powder of blue vitriol	$CuSO_4$	
Lime stone	$CaCO_3$	
Dilute hydrochloric acid	HCl + H_2O	

Ans.

Name of matter	Chemical composition	Main type of matter
Sea water	H_2O+ NaCl + $MgCl_2$ +….	Mixture
Distilled water	H_2O	Compound
Hydrogen gas filled in a balloon	H_2	Element
The gas in LPG Cylinder	C_4H_{10} + C_3H_8	Mixture
Baking soda	$NaHCO_3$	Compound
Pure gold	Au	Element
The gas in oxygen cylinder	O_2	Element
Bronze	Cu + Sn	Mixture
Diamond	C	Element
Heated white powder of blue vitriol	$CuSo_4$	Compound
Lime stone	$CaCO_3$	Compound
Dilute hydrochloric acid	HCl + H_2O	Mixture

Q.7) Write scientific reason.

a. Hydrogen is combustible, oxygen helps combustion, but water helps to extinguish fire.

Ans. 1) Water is a compound formed from hydrogen and oxygen. Hydrogen burns with a gentle explosion while oxygen supports burning.

2) But water does not burn nor it supports burning, as the property of compound is different from its constituent element.

3) Hence, hydrogen is combustible, oxygen helps combustion, but water helps to extinguish fire.

b. Constituent substance of a colloid cannot be separated by ordinary filtration.

Ans. 1) A colloid is a heterogeneous mixture where the sizes of the particles are very small. 2) The colloidal particles are of the order of 10^{-5} m in diameter that are very small. 3) The particles of a colloid can easily pass through a filter paper as the pore size of a filter paper is big. Hence, the constituents of a colloidal cannot be separated by filtration.

c. Lemon sherbet has sweet, sour and salty taste and it can be poured in a glass.

Ans. 1) Lemon sherbet is a homogeneous mixture of two or more substances like salt, sugar, water and lemon juice. 2) The particles of sugar and salt are completely soluble in lemon juice and water and get spread uniformly in it, do not involve any chemical reaction. 3) The constituents of sherbet maintain their individual properties. Hence, lemon sherbet is sweet, sour and salty to taste and it can be poured in a glass.

d. A solid matter has the properties of definite shape and volume.

Ans. 1) The molecules of solid are held together are very close to each other so their movement is limited. 2) The forces among the constituent particles (atom/molecules) are called intermolecular forces, the particles stay together in fixed position due to forces that are strong in solids which gives them definite shape and volume.

Q 8) Deduce the molecular formulae of the compound obtained from the following pairs of elements by the cross multiplication method.

a. C (Valency 4) & Cl (Valency 1)

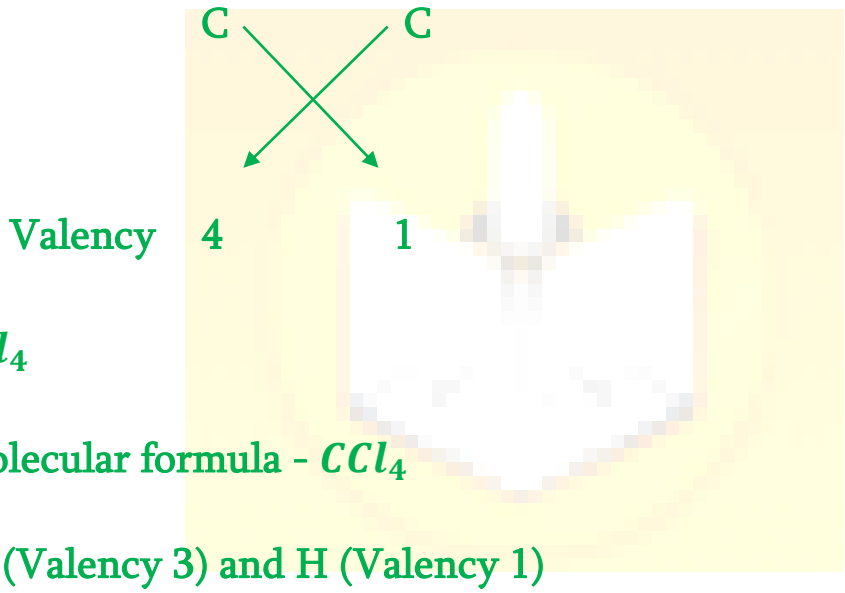
b. N (Valency 3) & H (Valency 1)

c. C (Valency 4) & O (Valency 2)

d. Ca (Valency 2) & O (Valency 2)

Ans.

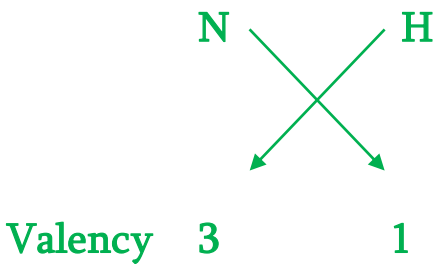
a) C (Valency 4) and Cl (Valency 1)



$C_1\,Cl_4$

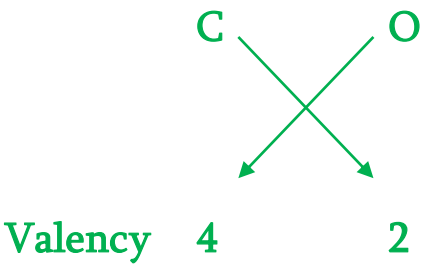
∴ Molecular formula - CCl_4

b) N (Valency 3) and H (Valency 1)



∴ Molecular formula - NH_3

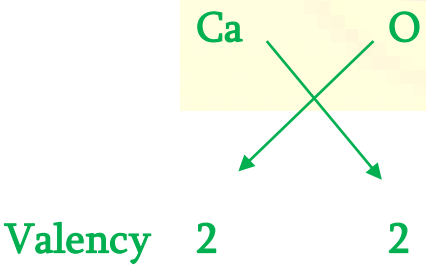
c) C (Valency 4) and O (Valency 2)



∴ Molecular formula - C_2O_4

∴ CO_2(dividing by 2)

d) Ca (Valency 2) and O (Valency 2)



∴ Molecular formula - Ca_2O_2

∴ CaO (dividing by 2)

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