

Composition of Matter

EXERCISE [PAGE 47]

Exercise | Q 1.1 | Page 47

Choose the appropriate option and rewrite the following statement.

The intermolecular force is _____ in the particles of solid.

1. Minimum
2. Moderate
3. **maximum**
4. indefinite

Solution: The intermolecular force is maximum in the particles of solid.

Exercise | Q 1.2 | Page 47

Choose the appropriate option and rewrite the following statement.

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

1. plasticity
2. **Incompressibility**
3. fluidity
4. elasticity

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

Exercise | Q 1.3 | Page 47

Choose the appropriate option and rewrite the following statement.

Matter is classified into the types mixture, compound and element by applying the criterion _____

1. **states of matter**
2. Phases of matters
3. chemical compositions of matter
4. all of these

Solution: Matter is classified into the types mixture, compound and element by applying the criterion states of matter.

Exercise | Q 1.4 | Page 47

Choose the appropriate option and rewrite the following statement.

Matter that contain two or more constituent substances is called _____

1. mixture
2. **compound**
3. element
4. metalloid

Solution: Matter that contain two or more constituent substances is called compound.

Exercise | Q 1.5 | Page 47

Choose the appropriate option and rewrite the following statement.

Milk is an example of type of matter called _____.

1. solution
2. **homogeneous mixture**
3. heterogeneous mixture
4. suspension

Solution: Milk is an example of type of matter called homogeneous mixture.

Exercise | Q 1.6 | Page 47

Choose the appropriate option and rewrite the following statement.

Water, mercury and bromine are similar o each other, because three are

1. **liquids**
2. compounds
3. nonmetals
4. elements

Solution: Water, mercury and bromine are similar to each other, because three are liquids.

Exercise | Q 1.7 | Page 47

Choose the appropriate option and rewrite the following statement.

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.

1. 1
2. 2
3. 3
4. 4

Solution: 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.

Exercise | Q 2.1 | Page 47

Identify the odd term out and explain

Gold, silver, copper, brass

Solution: Brass is odd one out because it is an alloy and gold, silver, copper are element.

Exercise | Q 2.2 | Page 47

Identify the odd term out and explain

Hydrogen, hydrogen peroxide, carbon dioxide, water vapour.

Solution: Hydrogen is odd one out because it is an element and others are compound.

Exercise | Q 2.3 | Page 47

Identify the odd term out and explain

Milk, lemon juice, carbon, steel.

Solution: Carbon is odd one out because it is an element and others are mixture of various elements.

Exercise | Q 2.4 | Page 47

Identify the odd term out and explain.

water, mercury, bromine, petrol.

Solution: Water is odd one out because it is universal solvent and rest are not universal solvent.

Exercise | Q 2.5 | Page 47

Identify the odd term out and explain.

sugar, slat, baking soda, blue vitrol.

Solution: Baking soda is odd one out because it is a mixture of various elements and others are compound.

Exercise | Q 2.6 | Page 47

Identify the odd term out and explain

Hydrogen, sodium, potassium, carbon.

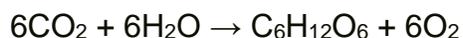
Solution: Carbon is odd one out because it has 4 valence electrons and others have 1 valence electron.

Exercise | Q 3.1 | Page 47

Answer the following question.

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.

Solution: Photosynthesis is a chemical process through which plants, some bacteria and algae, produce glucose and oxygen from carbon dioxide and water, using only light as a source of energy, which is absorbed by chlorophyll.



Four substances in this process are as follows:

1. Carbon dioxide = organic compound
2. Water = organic compound
3. Glucose = organic compound
4. Chlorophyll = organo-metallic compound or complex compound.

Exercise | Q 3.2 | Page 47

Answer the following question.

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

Solution: Brass is an alloy made primarily of copper, usually with zinc. Brass as a solid solution consisting of zinc and other metals as solute dissolved in copper taken as solvent. So that, the brass meets all the criteria of a solution.

Exercise | Q 3.3 | Page 47

Answer the following question.

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 mixture from the above information.

Solution: Characteristics of mixtures from above information are:

1. Constituent substances of a mixture are two or more elements or compounds.
2. The proportion of constituent substances in a mixture can be variable.
3. The properties of constituent substances are retained in the mixture.

Exercise | Q 4.01 | Page 47

Give two examples.

Liquid element

Solution: Liquid element = mercury, bromine

Exercise | Q 4.02 | Page 47

Give two examples.

Gaseous element

Solution: Gaseous element = oxygen, nitrogen, hydrogen

Exercise | Q 4.03 | Page 47

Give two examples.

Solid element

Solution: Solid element = sodium, carbon, aluminium

Exercise | Q 4.04 | Page 47

Give two examples.

Homogeneous mixture

Solution: Homogeneous mixture = sugar in water, corn oil, blood plasma

Exercise | Q 4.05 | Page 47

Give two examples.

Colloid

Solution: Colloid = mayonnaise, milk, butter, gelatin, jelly, muddy water

Exercise | Q 4.06 | Page 47

Give two examples.

Organic compound

Solution: Organic compound = proteins, glucose, urea, carbohydrates

Exercise | Q 4.07 | Page 47

Give two examples.

Complex compound

Solution: Complex compound = chlorophyll, hemoglobin, cyanocobalamin

Exercise | Q 4.08 | Page 47

Give two examples.

Inorganic compound

Solution: Inorganic compound = limestone, rust, common salt

Exercise | Q 4.09 | Page 47

Give two examples.

Metalloid

Solution: Metalloid = silicon, germanium

Exercise | Q 4.1 | Page 47

Give two examples.

Element with valency 1

Solution: Element with valency 1 = sodium, potassium, chlorine

Exercise | Q 4.11 | Page 47

Give two examples.

Element with valency 2

Solution: Element with valency 2 = magnesium, calcium

Exercise | Q 5 | Page 47

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

KCl, HBr, MgBr₂, K₂O, NaH, CaCl₂, CCl₄, HI, H₂S, Na₂S, FeS, BaCl₂

Solution:

Compounds	Name of compounds	Symbol of constituent elements	Valency of constituent elements
KCl	Potassium chloride	K, Cl	K = 1, Cl = 1
HBr	Hydrogen bromide	K, Br	K = 1, Br = 1
MgBr ₂	Magnesium bromide	Mg, Br	Mg = 2, Br = 1
K ₂ O	Potassium oxide	K, O	K = 1, O = 2
NaH	Sodium hydride	Na, H	Na = 1, H = 1
CaCl ₂	Calcium chloride	Ca, Cl	Ca = 2, Cl = 1
CCl ₄	Carbon tetrachloride	C, Cl	C = 4, Cl = 1
HI	Hydrogen iodide	H, I	H = 1, I = 1
H ₂ S	Hydrogen sulphide	H, S	H = 1, S = 2
Na ₂ S	Sodium sulphide	Na, S	Na = 1, S = 2
FeS	Iron (II) Sulfide	Fe, S	F = 2, S = 2
BaCl ₂	Barium chloride	Ba, Cl	B = 2, Cl = 1

Exercise | Q 6 | Page 47

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

Name of matter	Chemical composition	Main type of matter
Sea water	H ₂ O + NaCl + MgCl ₂	
Distilled water	H ₂ O	
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 vitroi	$CuSO_4$	
Lime stone	$CaCO_3$	
Dilute hydrochloric acid	$HCL + H_2O$	

Solution:

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 ballon	H_2	element(molecule)
The gas in LPG cylinder	$C_4H_{10} + C_3H_8$	mixture
Baking soda	$NaHCO_3$	mixture
Pure gold	Au	element
The gas in oxygen cylinder	$C_4H_{10} + C_3H_8$	element(molecule)
Bronze	$Cu + Sn$	mixture
Diamond	C	element(allotrope)
Heated white powder of blue vitroi	$CuSO_4$	compound
Lime stone	$CaCO_3$	compound
Dilute hydrochloric acid	$HCL + H_2O$	compound

Exercise | Q 7.1 | Page 47

Write scientific reason.

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

Solution: Water is made up of two elements, that's hydrogen and oxygen. Hydrogen is flammable, but oxygen is not. Flammability is the ability of a combustible material with an adequate supply of oxygen (or another oxidiser) to sustain enough heat energy to keep a fire going after it has been ignited. Though water is made up of two atoms of hydrogen and one atom of oxygen by forming an ionic compound, it does not possess the characteristics of them because a compound does not have the properties of its constituent elements. Therefore, water has its own properties, which helps to extinguish fire.

Exercise | Q 7.2 | Page 47

Write scientific reason.

Constituent substances of a colloid cannot be separated by ordinary filtration.

Solution: Constituent substances of a colloid cannot be separated by ordinary filtration because the size of the particles in a colloid (or colloidal solution) is bigger than those in a true solution but smaller than those in suspension. It is in between 1 nm to 100 nm in diameter. The size of ordinary filter paper is more than 100 nm due to which colloidal particles are passed through the pores of a filter paper. Due to which, we prefer to use ultrafilter paper so that, filtration of colloidal particles take place easily.

Exercise | Q 7.3 | Page 47

Write scientific reason.

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

Solution: Lemon sherbat has sweet, sour and salty taste and it can be poured in a glass because sour taste indicates presence of an acid and if acid is poured in a vessel made up of metal, then acid reacts with metal and makes it poisonous in nature. So we prefer to take vessel made up of glass material.

Exercise | Q 7.4 | Page 47

Write scientific reason.

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

Solution: A solid matter has the properties of definite shape and volume because of the following reasons:

- 1) Intermolecular force of attraction between the particles of matter is very strong.
- 2) Internuclear space between the particles of matter is negligible.
- 3) Particles of matter are very close to each other that they only vibrate at their fixed position.

Exercise | Q 8.1 | Page 47

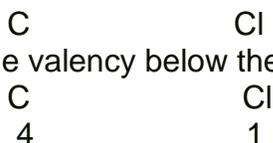
Deduce the molecular formulae of the compound obtained from the following pairs of elements by the cross multiplication method.

C (Valency 4) & Cl (Valency 1)

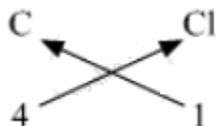
Solution: C (Valency 4) & Cl (Valency 1) :

Step 1 : Write the symbols of the radicals.

Step 2 : Write the valency below the respective radical.



Step 3 : Cross-multiply symbols of radicals with their respective valency.



Step 4 : Write down the chemical formula of the compound.
CCl₄

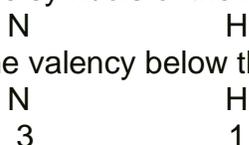
Exercise | Q 8.2 | Page 47

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

N (Valency 3) & H (Valency 1)

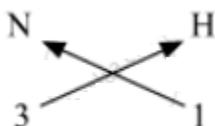
Solution: N (Valency 3) & H (Valency 1)

Step 1 : Write the symbols of the radicals.



Step 2 : Write the valency below the respective radical.

Step 3 : Cross-multiply symbols of radicals with their respective valency.



Step 4 : Write down the chemical formula of the compound.

NH₃

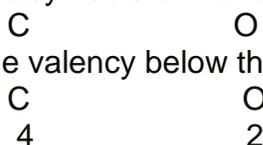
Exercise | Q 8.3 | Page 47

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

C (Valency 4) & O (Valency 2)

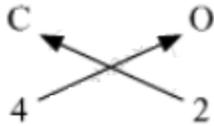
Solution: C (Valency 4) & O (Valency 2)

Step 1 : Write the symbols of the radicals.



Step 2 : Write the valency below the respective radical.

Step 3 : Cross-multiply symbols of radicals with their respective valency.



Step 4 : Write down the chemical formula of the compound.

CO₂

Exercise | Q 8.4 | Page 47

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

Ca (Valency 2) & O (Valency 2)

Solution: Ca (Valency 2) & O (Valency 2)

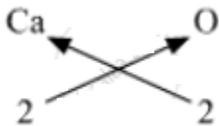
Step 1 : Write the symbols of the radicals.



Step 2 : Write the valency below the respective radical.



Step 3 : Cross-multiply symbols of radicals with their respective valency.



Step 4 : Write down the chemical formula of the compound.

CaO