Chapter 1: Language of Chemistry

A. Answer the following in not more than 20 words.

1. What does the formula of a substance tell you?

Ans:

i. Formula of a compound or an element represents the type and number of atoms present in one molecule of that compound or element.

2. What do you mean by the valency of an element?

Ans:

i. The number of electrons that can be donated, accepted or shared by an atom of an element during a chemical reaction is equal to the valency of that element.
ii. It represents the combining capacity of an atom.

3. What is the following called?

A group of atoms of two or more elements behaving like an atoms and having a valency.

Ans:

i. A compound radical is a group of two or more elements that acts as a single atom with a specific valency, in a chemical reaction.

4. Name two elements that have variable valency. Give the formulae and Name two components formed by each of these elements.

Ans:

Two elements having variable valency and compounds formed by them are as follows:

(i) Copper (Cu):
Cuprous oxide [Copper(I)oxide] – Cu_2O
Cupric oxide [Copper(II)oxide] – CuO

(ii) Iron (Fe):
Ferrous oxide [Iron(II)oxide] – FeO
Ferric oxide [Iron(III)oxide] – Fe_2O_3

5. What is balanced chemical equations ? Why should a chemical equation be balanced?

Ans:

i. A balanced chemical reaction is one in which the number of atoms on the side of the products is equal to the number of atoms on the side of the reactants.
ii. The number of atoms on the side of reactants is always equal to the number of atoms on the side of the products in a chemical reaction, i.e., no atom is lost during a chemical reaction. We balance a chemical reaction to represent this fact.

B.Find the valencies of the underlined elements or radicals a chemical equation be balanced?

Ans:

Compound	Valency of Underlined Elements of Radicals
$\underline{Ba}Cl_2$	2
$\underline{P}Cl_3$	3
$\underline{P}Cl_5$	5
$\underline{N}H_3$	3
$Mg\underline{SO}_4$	2
$Ca\underline{CO}_3$	2
$\underline{Na}_2O$	1
$\underline{Ca}O$	2
$\underline{Ca}(OH)_2$	2
$\underline{Fe}SO_4$	2
$\underline{Fe}Cl_3$	3
$\underline{Fe}_2O_3$	3
$Na\underline{OH}$	1
$\underline{Al}(OH)_3$	3
$Na_2\underline{CO}_3$	1

C.Answer the following in not more than 100 words.

1.What are compounds radicals? Give examples of a few radicals, along with their vacancies. Also mention some compounds containing compounds radicals. Give the valencies of the parts that make up the compound.

Ans:

i.   Compound radical is a group of atoms of different elements that behave as an intact unit during a chemical reaction.

ii.   Atoms in a compound radical do not break apart revealing the individual atoms but remain together forming an intact group of atoms having a valency. This unit behaves just like an atom or a molecule during a reaction.

iii.   Some compound radicals with their valencies are given below:

Compound Radical	Valency
OH	1
SO_4	2
NO_3	1
CO_3	2

Some compounds containing compound radicals:

Compound	Name	Compound Radical	Valency
$NaOH$	Sodium hydroxide	OH	1
H_2SO_4	Sulphuric acid	SO_4	2
Na_2CO_3	Sodium carbonate	CO_3	2
$(NH_4)_2SO_4$	Ammonium sulphate	SO_4	2

KNO$_3$	Potassium nitrate	NO$_3$	1

D.Complete the following

Ans:

1. A <u>symbol</u> is an abbreviation of the name of an element.
2. A molecule of an element or a compound is represented by its <u>formula</u>.
3. The valencies of the two elements of a binary compound are <u>transposed</u> to obtain its formula.
4. Atoms are neither lost nor <u>gained</u> in a chemical reaction.

E.Choose the correct Option

Ans:

1.Which of the following is the symbol of gold ?

Ans: (c) Au (Because Symbol of gold is Au.)

2.Which of the following is a divalent radical ?

Ans: (c) Sulphate   (Because Sulphate (SO−4) is a divalent radical.)

3.The valency of sulphur of sulphur dioxide is

Ans:(d) 4   (Because Sulphur dioxide has two atoms of oxygen, each with a valency of 2. To satisfy this, sulphur has a valency of 4 in SO$_2$.)

4.How many times greater is the valency of N in NH$_3$, than that of Cl in HCl ?

Ans: (b) 3   (Because   Valency of N in NH$_3$ is 3, whereas the valency of Cl in HCl is 1. Hence, the valency of N in NH$_3$ is three times greater than that of Cl in HCl.)

F.Match the Following

Ans:

Column A		Column B	
(a)	Helium	(ii)	Hi
(b)	Mercury	(i)	Hg
(c)	Copper	(v)	Cu
(d)	Calcium	(vi)	Ca
(e)	Phosphorus	(iv)	P
(f)	Lead	(iii)	Pb

G.True or false ?

Ans:

1. **True.** The valency of hydrogen is 1.
2. **True.** The valency of oxygen is 2.
3. **False.** Symbol of iron is Fe.
4. **True.** The symbol of silver is Ag.
5. **False.** Calcium chloride is CaCl$_2$.
6. **True.** The valency of both zinc and oxygen is 2. So, zinc oxide is ZnO.

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H.Write the formulae of each of the following compounds.

Ans:

Compound	Formula
Water	H_2O
Calcium oxide	CaO
Carbon dioxide	CO_2
Carbon monoxide	CO
Magnesium oxide	MgO
Hydrogen chloride	HCl
Sodium chloride	NaCl
Potassium chloride	KCl
Magnesium chloride	$MgCl_2$
Zinc chloride	$ZnCl_2$
Nitric acid	HNO_3
Sodium nitrate	$NaCO_3$

Sodium carbonate	Na_2CO_3
Potassium carbonate	K_2CO_3
Calcium carbonate	$CaCO_3$