

Class – 7

Sub. – Chemistry

Chapter – 4

Atoms, Molecules and Radicals

Short answer questions:

Q.1 – Define atom and molecule.

Ans. – Atom – An Atom is the smallest part of an element that can take part in a chemical reaction.

Molecule – A molecule is the smallest part of an element or a compound that is capable of independent existence.

Q.2 – What do you mean by the atomicity of an element?

Ans. - The number of atoms in a molecule of an element or a compound is known as it's atomicity.

Q.3 – What are atomicities of neon, Oxygen, ozone, phosphorus and sulphur ?

Ans.- Neon – 1

Oxygen – 2

Ozone – 3

Phosphorus – 4

Sulphur – 8

Q.4 – What do you mean by the valency of an element ? How is it expressed ? Name two divalent elements ?

Ans.- The combining capacity of an element with other elements is known as its valency.

The valency of an element is expressed by the number of hydrogen atoms an atom of the element combines with or displaces from a compound.

Example of divalent elements – Oxygen and Calcium.

Q.5 – What do you mean by the groups and periods of the Periodic table ?

Ans. - Groups – The periodic table contains 18 vertical columns, called groups.

Periods – The periodic table contains 7 horizontal rows, called periods.

Q.6 – What is the correlation between the valency of an element and its position in the periodic table ?

Ans. - Elements present in same group show valency equal to the group number.

Q7 – What is the valency of the underlined element or radical in each of the following compounds ?

Ans. - a.3

b.2

c.2

d.3

e.2

f.1

g.2

h.1

Long answer questions:

Q.1 – Discuss how atoms, molecules and radicals differ from each other. Give examples.

Ans. -

Property	Atom	Molecule	Radical
1. Independent existence	Not capable	Capable	Capable
2. Charge	Not charged	Not charged	Charged

3. Valency	Has a valency	Has no valency	Has a valency
4. Number of constituent elements	Only one	One or more than one	One or more than one
5. How it takes part in a chemical reaction	Directly	Breaks into atoms, which take part in a reaction	Takes part in a reaction as a unit

Q.2 – Describe giving three examples, how atoms form molecules.

Ans. – An atom of hydrogen combines with another atom of hydrogen to form molecule of element of hydrogen. The molecules of oxygen, nitrogen and chlorine are also made up of two atoms each of the corresponding element and therefore represented by the formula O_2 , N_2 , Cl_2 respectively.

Q.3 – Can valency of an element be variable ? If it can, mention two such elements and show how they form compounds. How are compounds named ?

Ans. – Yes, valency of an element can be variable.

Example – Copper (1 and 2)and iron (2 and 3) show variable valency.

Compounds of copper – $\text{CuCl} \rightarrow$ Copper(I) chloride

$\text{CuCl}_2 \rightarrow$ Copper (II) chloride

Compounds of iron – $\text{FeO} \rightarrow$ Iron(II) oxide

$\text{Fe}_2\text{O}_3 \rightarrow$ Iron (III) oxide

Bookwork

Objective Questions:

Choose the correct option:

1. Which of the following species can exist independently?

Ans. Option d.- Ne

2. Which of the following species cannot exist independently ?

Ans. Option c. – N

3. Which of the following has an atomicity of 3 ?

Ans. Option d. – ozone

4. If the valency of oxygen is 2, what is the valency of copper in CuO ?

Ans. Option b. – 2

Fill in the blanks :

1. An atom is the smallest part of **an element** that takes part in a chemical reaction.
2. A molecule is the smallest part of an element or a **compound** that can exist independently.
3. A molecule of a noble gas element contains **one** atom.
4. Complete the following table :

Positive radical	Negative radical	Formula of the compound	Name of the compound
Na ⁺	O ²⁻	Na ₂ O	Sodium oxide
Ca ²⁺	S ²⁻	CaS	Calcium sulphide
Ca ²⁺	OH ⁻	Ca(OH) ₂	Calcium hydroxide
Zn ²⁺	SO ₄ ²⁻	ZnSO ₄	Zinc sulphate

Al^{3+}	O^{2-}	Al_2O_3	Aluminum oxide
Cu^{2+}	CO_3^{2-}	CuCO_3	Copper carbonate
Na^+	HCO_3^-	NaHCO_3	Sodium hydrogen carbonate or sodium bicarbonate

Write T for true and F for false for the following statements:

1. HCl is a diatomic molecule . **T**
2. The valency of a radical is the same as the charge over it. **T**
3. The valency of a group – 14 element is 4. **T**
4. Calcium, an element of group 2 of the periodic table, forms Ca_2H . **F**