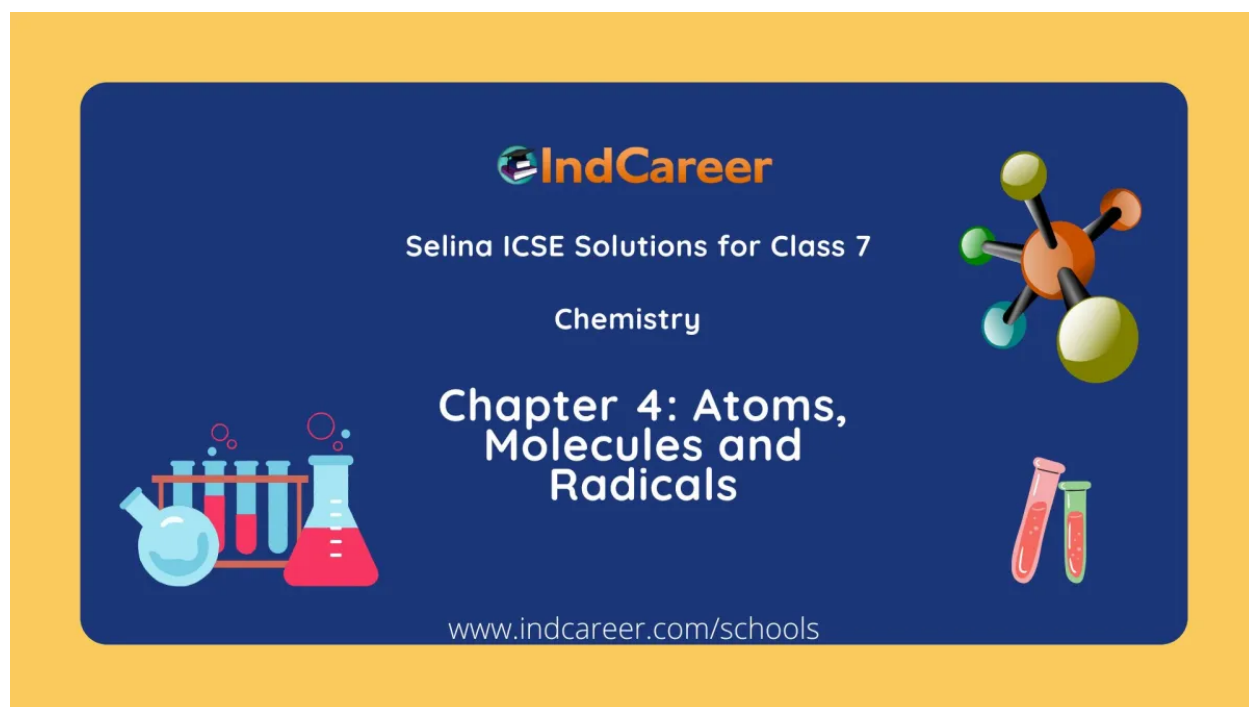


# Selina Class 7 ICSE Solutions Chemistry :

## Chapter 4- Atoms, Molecules and Radicals



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# Selina Class 7 ICSE Solutions Chemistry :

## Chapter 4- Atoms, Molecules and Radicals

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### Selina Class 7 ICSE Solutions Chemistry : Chapter 4- Atoms, Molecules and Radicals

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#### EXERCISE

##### Question 1.

Define the following terms :

**Answer:**

1. **Atom** : An atom is the smallest indivisible unit of an  
OR  
Atom is the smallest unit of matter.
2. **Molecule** : Molecule is the smallest unit of a compound (or an element) which always has an independent existence.
3. **Radicals** : A radical is an atom of an element or a group of atoms of different elements that behaves as a single unit with a positive or negative charge on it.
4. **Valency** : It is the number of electrons donated or accepted by the valence shell of an atom during chemical combination.
5. Periodic table represents the tabular arrangement of elements in horizontal rows called periods and vertical columns called groups in order to classify the elements and their systematic study.

##### Question 2.

Write the names of the elements present in the following compounds.

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**Answer:**

1. **Common salt** : Sodium, chlorine.
2. **Ammonia** : Nitrogen, hydrogen.
3. **Sulphuric acid** : Hydrogen, sulphur, oxygen.
4. **Glucose** : Carbon, hydrogen, oxygen.
5. **Sodium hydroxide** : Sodium, oxygen, hydrogen.
6. **Acetic acid** : Carbon, hydrogen, oxygen.

**Question 3.**

What does each of the following represent ?

**Answer:**

1.  $2\text{CO}_2$  = 2 molecules of carbon dioxide.
2.  $2\text{H}_2\text{S}$  = 2 molecules of hydrogen sulphide.
3.  $5\text{H}_2\text{SO}_4$  = 5 molecules of sulphuric acid.
4.  $6\text{NaNO}_3$  = 6 molecules of sodium nitrate.

**Question 4.**

Write the symbols and valencies of the following radicals:

**Answer:**

| Element           | Symbol             | Valencies |
|-------------------|--------------------|-----------|
| (a) Magnesium ion | $\text{Mg}^{2+}$   | 2         |
| (b) Ammonium      | $\text{NH}_4^+$    | 1         |
| (c) Carbonate     | $\text{CO}_3^{2-}$ | 2         |
| (d) Nitrate       | $\text{NO}_3^-$    | 1         |
| (e) Oxide         | $\text{O}^{2-}$    | 2         |
| (f) Bisulphate    | $\text{HSO}_3^-$   | 1         |
| (g) Aluminium ion | $\text{Al}^{3+}$   | 3         |

**Question 5.**

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Name the following radicals :

**Answer:**

1.  $\text{SO}_4^{2-}$  = Sulphate
2.  $\text{HCO}_3^-$  = Bicarbonate
3.  $\text{OH}^-$  = Hydroxide
4.  $\text{Cr}_2\text{O}_7^{2-}$  = Dichromate

**Question 6.**

1. Name one ion for each of the valencies +1, +2 and +3.
2. Name one ion for each of the valencies -1, -2 and -3.

**Answer:**

1. +1 = Sodium  $\text{Na}^+$   
+2 = Calcium  $\text{Ca}^{+2}$   
+3 = Aluminium  $\text{Al}^{+3}$
2. -1 = Chlorine  $\text{Cl}^-$   
-2 = Oxygen  $\text{O}^{2-}$   
-3 = Nitrogen  $\text{N}^{3-}$

**Question 7.**

The valency of calcium is 2. Write the valencies of other radical in the following :

1.  $\text{CaO}$
2.  $\text{Ca(OH)}_2$
3.  $\text{CaCO}_3$
4.  $\text{CaCl}_2$

**Answer:**

1.  $\text{O} = 2$
2.  $\text{OH} = 1$
3.  $\text{CO}_3 = 2$
4.  $\text{Cl} = 1$

**Question 8.**

Write the names of the following compounds :

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Answer:

| Compound                         | Name               |
|----------------------------------|--------------------|
| (a) $(\text{NH}_4)_2\text{SO}_4$ | Ammonium Sulphate  |
| (b) $\text{Ca}(\text{NO}_3)_2$   | Calcium Nitrate    |
| (c) $\text{FeS}$                 | Iron Sulphide      |
| (d) $\text{Na}_3\text{PO}_4$     | Sodium Phosphate   |
| (e) $\text{NH}_4\text{OH}$       | Ammonium Hydroxide |
| (f) $\text{CuCO}_3$              | Copper Carbonate   |
| (g) $\text{HgO}$                 | Mercuric Oxide     |
| (h) $\text{ZnCl}_2$              | Zinc Chloride      |
| (i) $\text{ZnS}$                 | Zinc Sulphide      |
| (j) $\text{H}_2\text{S}$         | Hydrogen Sulphide  |

Question 9.

Write the molecular formulae of:

Answer:

| Compound                | Molecular Formula            |
|-------------------------|------------------------------|
| (a) Sodium sulphide     | $\text{Na}_2\text{S}$        |
| (b) Magnesium oxide     | $\text{MgO}$                 |
| (c) Calcium hydroxide   | $\text{Ca}(\text{OH})_2$     |
| (d) Hydrogen chloride   | $\text{HCl}$                 |
| (e) Sulphuric acid      | $\text{H}_2\text{SO}_4$      |
| (f) Iron (II) sulphide  | $\text{FeS}$                 |
| (g) Iron (III) sulphate | $\text{Fe}_2(\text{SO}_4)_3$ |
| (h) Nitric acid         | $\text{HNO}_3$               |
| (i) Calcium phosphate   | $\text{Ca}_3(\text{PO}_4)_2$ |
| (j) Aluminium sulphate  | $\text{Al}_2(\text{SO}_4)_3$ |
| (k) Magnesium nitride   | $\text{Mg}_3\text{N}_2$      |

Question 10.

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The valency of sodium is one, write the molecular formula for the following compounds of sodium.

1. **sodium oxide** :  $\text{Na}_2\text{O}$
2. **sodium sulphate** :  $\text{Na}_2\text{SO}_4$
3. **sodium carbonate** :  $\text{Na}_2\text{CO}_3$
4. **sodium hydroxide** :  $\text{NaOH}$
5. **sodium nitrate** :  $\text{NaNO}_3$

**Question 11.**

What is variable valency ? Give two examples of elements showing variable valency.

**Answer:**

There are some elements with more than one valency. They are said to have variable valency, e.g. Iron, copper.

**Question 12.**

Give the group number of following elements present in periodic table

1. **Magnesium** : IIA
2. **Carbon** : IVA
3. **Sulphur** : VIA
4. **Neon** : Zero

**Question 13.**

An element belongs to group VA. What would be its valency? Name two such elements.

**Answer:**

Elements of group VA has valency 3.

Two elements : Nitrogen and phosphorus.

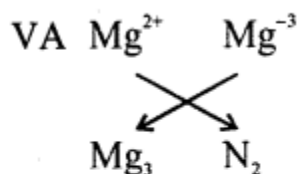
**Question 14.**

An element belongs to group II. What would be its valency? Write the formula of molecules of compounds it will form with elements in VA, VIA and VIIA groups.

**Answer:**

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Valency 2.



VIA

| Symbols   |       | Valencies |       |
|-----------|-------|-----------|-------|
| Magnesium | Oxide | Magnesium | Oxide |
| Mg        | O     | 2+        | 2-    |

(i) Write the symbols

On the left hand side

Calcium

Ca

On the right hand side

Chloride

Cl

(ii) Write the valency of the symbols

At the top right corner

Positive ion

$Ca^{2+}$

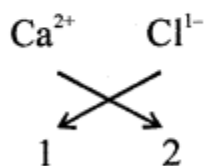
At the top right corner

Negative ion

$Cl^{1-}$

(iii) Interchange the valency number

(Ignore the (+) and (-) signs)



(iv) Write the interchanged numbers at the base

But ignore the + and the - signs

$Ca_1$

$Cl_2$

## OBJECTIVE TYPE QUESTIONS

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1. Fill in the blanks:

Answer:

1. Atoms are **neutral**.
2. An ion with positive charge is called **cation**.
3. An ion with negative charge is called **anion**.
4.  $2\text{H}_2$  means two **atoms** of hydrogen.
5. **Ozone** is a triatomic molecule.
6. Metals have **variable** valency.
7. Chemical name of caustic soda is **sodium hydroxide NaOH**.

2. Tick (✓) the correct answer.

(a) The valency of iron in  $\text{Fe}_2\text{O}_3$  is

1. 1
2. 2
3. **3**
4. 6

(b) Which of the following has valency 4 ?

1. aluminium
2. oxygen
3. carbon
4. **phosphorus**

(c) The sulphate radical is written as  $\text{SO}_4^{2-}$ . What is the formula of calcium sulphate ?

1.  $\text{Ca}(\text{SO}_4)_2$
2.  $\text{Ca}_2(\text{SO}_4)$
3.  $\text{Ca}(\text{SO}_4)_3$
4.  **$\text{CaSO}_4$**

(d) Which of the following exhibit variable valency ?

1. calcium
2. **copper**
3. carbon
4. chlorine

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3. State the term for the following:

1. The number of atoms present in a molecule of an element **atomicity**.
2. The symbolic representation of a molecule **molecular formula**.
3. A group of atoms that react as a single unit **molecule**.
4. The combining capacity of an element **valency**.
5. The tabular arrangement of elements in horizontal rows and vertical columns **periodic table**.



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- Chapter 2- Physical and Chemical Changes
- Chapter 3- Elements, Compounds and Mixtures
- Chapter 4- Atoms, Molecules and Radicals
- Chapter 5- Language of Chemistry
- Chapter 6- Metals and Non-metals
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