

# NTSE

NCERT Solutions for Class 9 Science  
CHEMISTRY – Atoms and Molecules



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## NCERT ANNEXURE

Below you can go through the subjective type questions and solutions from NCERT Annexure.

1. **Hydrogen and oxygen combine in the ratio 1:8 by mass to form water. What mass of oxygen gas would be required to react completely with 3.0 g of hydrogen gas?**

**Ans.:** 1 g of Hydrogen gas requires 8 g of oxygen gas to form water.

3g of Hydrogen gas will require = of oxygen  
of oxygen.

Thus 3 g of Hydrogen gas requires 24 g of oxygen gas to react completely to form water.

2. **A 0.24 g sample of compound of oxygen and boron was found by analysis to contain 0.096 g of boron and 0.144 g of oxygen. Calculate the percentage composition of the compound by weight.**

**Ans.:** Mass of boron as given = 0.096 g

Mass of oxygen as given = 0.144 g

Mass of sample as given = 0.24 g

∴ Percentage of boron by weight in the compound =  $(0.096 \div 0.24) \times 100 = 40\%$

∴ Percentage of oxygen by weight in the compound =  $(0.144 \div 0.24) \times 100 = 60\%$

∴ Percentage composition of the compound is Boron 40% & Oxygen 60%

Or Boron : Oxygen = 40 : 60 = 2:3

3. **a) Define atom.**

**b) Why is it not possible to see an atom with naked eyes?**

**c) Define molecule. What is basic difference between atoms and molecules?**

**Ans.:** a) **Atom:** An atom is the smallest particle of an element that may or may not exist independently & retains all the chemical properties of the element.

b) Atoms are very small in size, smaller than anything which is visible to our eyes. Therefore it is not possible to see them with naked eyes.

c) **Molecule:** A molecule can be defined as the smallest particle of an element or a compound that is capable of an independent existence and shows all the properties of that substance.

Atoms, except those of noble or inert gas elements, cannot exist independently. However, all molecules can have independent existence.

4. **Before selecting C-12 atom for calculating relative atomic masses, oxygen was taken as reference. Why? What was the reason for changing the reference to C-12?**

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**Ans.:** Oxygen was selected because of the following two reasons:

- Oxygen combines with most of the elements to form compounds.
- By comparing with mass of oxygen taken as 16, the relative atomic masses of most of the elements were found to be whole numbers (not fractions).

Now oxygen is not taken as reference because it was found that naturally occurring oxygen is a mixture of atoms of slightly different masses (called isotopes).

**5. What do you mean by molecular mass and formula unit mass?**

**Ans.:** **Molecular Mass:** The molecular mass of a substance is the sum of atomic masses of all the atoms in one molecule of that substance. It is therefore the relative mass of molecule expressed in atomic mass unit.

**Formula unit mass:** It is the sum of the relative atomic masses of all atoms (ions) in one formula unit of an ionic compound.

## NCERT EXEMPLAR

Here are the Objective Type questions and solutions from NCERT Exemplar.

**1. Which of the following statements is not true about an atom?**

- Atoms are not able to exist independently
- Atoms are the basic units from which molecules and ions are formed
- Atoms are always neutral in nature
- Atoms aggregate in large numbers to form the matter that we can see, feel or touch

**Ans. (A)**

**2. The chemical symbol for nitrogen gas is**

- Ni
- N<sub>2</sub>
- N<sup>+</sup>
- N

**Ans. (B)**

**3. A change in the physical state can be brought about**

- Only when energy is given to the system
- Only when energy is taken out from the system
- When energy is either given to, or taken out from the system
- Without any energy change

**Ans. (C)**

**4. Which of the following represents a correct chemical formula? Name it.**

- CaCl
- BiPO<sub>4</sub>
- NaSO<sub>4</sub>
- NaS

**Ans. (b) BiPO<sub>4</sub>— Both ions are trivalent Bismuth phosphate**

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*M. Pareek*

An  
**NTSE Scholar**  
IIT-JEE (Adv.) AIR-3

Mukesh Pareek



5. Give the formulae of the compounds formed from the following sets of elements

(a) Calcium and fluorine

(b) Hydrogen and sulphur

(c) Nitrogen and hydrogen

(d) Carbon and chlorine

(e) Sodium and oxygen

(f) Carbon and oxygen

**Ans.** (a)  $\text{CaF}_2$

(b)  $\text{H}_2\text{S}$

(c)  $\text{NH}_3$

(d)  $\text{CCl}_4$

(e)  $\text{Na}_2\text{O}$

(f)  $\text{CO}$ ,  $\text{CO}_2$

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