Class 7th Living science solution 2017-18
CHAPTER 3. STRUCTURE OF MATTER

P. 28 Oral Questions For Formative Assessment

1. Smallest particle of an element is an atom of that element. Smallest particle of a compound is a molecule of that compound.

2. No, as atoms of some elements may not exist independently.

3. No, because most elements have a tendency to combine with each other to form compounds.

4. No, it is incorrect.

5. Yes, it is correct.

P. 33 Oral Questions For Formative Assessment

1. Symbol - O, formula - O_2

2. Valency. No, this is not a modern definition.

3. 3, 6

4. No, the number of hydrogen atoms is not equal in both sides.

P. 34 For Formative and Summative Assessment

A. 1. c 2.d 3.a 4. b 5. c 6. c 7.b 8.d 9.b

B. 1. atom 2. molecule 3. oxygen 4. hydrogen 5. 3 6. a mixture 7. a mixture

8. an atom, a. Co, b. Cu, c. Cl, d. C

9. a. H_2SO_4, b. $Ca(OH)_2$, c. $C_6H_{12}O_6$, d. NaCl 10.2 11. true 12. false

C. 1. When two elements mix together, they combine chemically in a fixed ratio to form a compound.

2. The properties of different compounds are so different from each other due to following reasons:

(i) Their constituent elements are different.

(ii) Sometimes their constituent elements are same but ratios are different. Example, H_2O (Water) and H_2O_2 (Hydrogen peroxide)

3. Many elements have a great tendency to combine with each other to form compounds. These elements are, therefore, not found in the Free State in nature.

4. On heating a mixture of iron and sulphur, a black substance called iron sulphide is formed. The ratio of iron and sulphur in iron sulphide is always 7 : 4.

5. A formula represents:

(i) the types of elements present in the compound. (ii) the number of atoms of each element present in the compound. (iii) the molecule of the compound.

6. A radical is a group of atoms either in a compound or existing alone.

Examples: Nitrate NO_3^{-1} Valency 1

Ammonium NH_4^{-1} Valency 1

Sulphate SO_4^{-2} Valency 2

Carbonate CO_2^{-2} Valency 2

7. The valencies of other elements or radicals is the number of hydrogen atoms which can combine with or be displaced by one atom of that element or radical.

D. 1. The differences between an element and a compound are as follows.

Element	Compound
(i) A substance that cannot be decomposed into simpler substances by chemical means and is made up of only one kind of atoms is called an element. Examples: hydrogen, oxygen	(i) A substance formed by the chemical combination of two or more elements in fixed proportions is called a compound. Example: water
(ii) An element cannot be broken further.	(ii) A compound can be broken into its constituent elements by chemical reaction.
(iii) There are 117 elements on the earth.	iii) There are innumerable compounds around us.

2. An atom is the smallest particle of an element that can take part in a chemical reaction. It may or may not exist independently.

A molecule is the smallest particle of an element that can normally exist independently.

Yes, a molecule of an element can be the same as its atom. That means its atom exists independently. This element is known as mono atomic element. Example: He (Helium).

3. a. sodium oxide Na_2O b. magnesium nitrate $Mg(NO_3)_2$

c. magnesium sulphate $MgSO_4$ d. aluminium chloride $AICI_3$

4. A chemical equation shows the result of a chemical reaction in which the reactants and the products are represented by symbols or formulae. Example: Fe + S ---> FeS

It is necessary to balance an equation because the number of each element should be the same on both sides of the equation. Example: H2O --> H2 + 02 [Not balanced] 2H20 --> 2H2 + 02 [Balanced]

5. a. Mg + H2SO4 --> MgSO4 + H2 It is a balanced equation.

b. CaCO3 + HCI -> CaCl2 + H2O + CO2 [Not balanced]

CaCO3 + 2HCI --> CaCl2 + H2O + CO2 [Balanced] c. CaO + H2O --> Ca(OH)2 It is a balanced equation.

d. Ag + HNO3 --> AgNO3 + H2O + NO2 [Not balanced] Ag + 2HNO3 --> AgNO3 + H2O + NO2 [Balanced]

6. The formula of a compound can be written if the symbols of its elements or radicals and their valencies are known. For example, calcium chloride The elements in calcium chloride are calcium and chlorine. The valency of calcium is 2 and the valency of chlorine is 1.

So we write them as Ca^{+2} CI^{-1}. There is no common factor in the valencies 2 and 1.

Interchanging the valencies and writing them as subscripts, we get the formula of calcium chloride as $CaCl_2$.

HOTS Questions

1. Its formula is X only if it is a monoatomic element, e.g. helium He; calcium Ca, carbon C.

In case of elements that are not monoatomic, the formula is different; e.g. nitrogen N_2, Phosphorus P_4.

2. A broken atom of gold will not have the same properties as an atom of gold.

3. In spite of being the second most abundant element in the universe, there are no known compounds of helium because it is an unreactive element with 0 valency.