Unit 12 – Atomic Structure

Class: VIII

Subject: Science

1. Choose the best answer.

1. The same proportion of carbon and oxygen in the carbon dioxide obtained from different sources proves the law of_____

a) reciprocal proportion **b) definite proportion**

c) multiple proportion d) conservation of mass

2. Cathode rays are made up of

a) neutral particles b) positively charged particles

c) negatively charged particles d) None of the above

3. In water, hydrogen and oxygen are combined in the ratio of _____by mass.

a) 1:8 b) 8:1 c) 2:3 d) 1:3

4. Which of the following statements made by Dalton has not undergone any change?

a) Atoms cannot be broken.

b) Atoms combine in small, whole numbers to form compounds.

c) Elements are made up of atoms.

d) All atoms of an elements are alike

5. In all atoms of an element

a) the atomic and the mass number are same.

b) the mass number is same and the atomic number is different.

c) the atomic number is same and the mass number is different

d) both atomic and mass numbers may vary.

II. Fill in the blanks.

1. **Atom** is the smallest particle of an element.
2. An element is composed of **same kind of** atoms.
3. An atom is made up of **Proton** **electron** and **Neutron**
4. A negatively charged ion is called **anion**, while positively charged Ion is called **cation**
5. **Electron** is a negatively charged particle (Electron/Proton).
6. Proton is deflected towards the **negatively** charged plate (positively, negatively).

III. Match the following.

1. Law of Conservation of Mass – Lavoisier
2. Law of Constant Proportion – Joseph Proust
3. Cathode rays – Sir William Crookes
4. Anode rays – Goldstein
5. Neutrons – James Chadwick

IV. Answer briefly.

1. State the law of conservation of mass.

The law states that during any chemical change, the total mass of the products is equal to the total mass of the reactants.

2. State the law of constant proportions.

states that in a pure chemical compound the elements are always present in definite proportions by mass.

3. Write the properties of anode rays.

- Anode rays travel in straight lines.
- Anode rays are made up of material particles.
- Anode rays are deflected by electric and magnetic fields. Since, they are deflected towards the negatively charged plate, they consist of positively charged particles.
- The properties of anode rays depend upon the nature of the gas taken inside in the discharge tube.
- The mass of the particle is the same as the atomic mass of the gas taken inside the discharge tube.

4. Define valency of an element with respect to hydrogen.

Valency of an element is defined as the number of hydrogen atoms which combine with one atom of it.

5. Define the term ions or radicals.

An atom or a group of atoms when they either lose or gain electrons, get converted into ions or radicals.

6. What is a chemical equation?

A chemical equation is a short hand representation of a chemical reaction with the help of chemical symbols and formula

7. Write the names of the following compounds.

a) CO b) N_2O c) NO_2 d) PCl_5

CO - Carbon monoxide.

N_2O - Nitrous oxide

NO_2 - Nitrogen dioxide

PCl_5 - Phosphorous pentachloride

V. Answer the following.

1. Find the valency of the element which is underlined in the following formula. a) NaCl b) CO_2 c) Al (PO_4) d) Ba $(NO_3)_2$ e) $CaCl_2$

a) NaCl = 1

b) CO_2 = 4

c) Al (PO_4) = 3

d) Ba $(NO_3)_2$ = 2

e) $CaCl_2$ = 2

2. Write the chemical formula for the following compounds

a) Aluminium sulphate b) Silver nitrate

c) Magnesium oxide d) Barium chloride

a) Aluminium sulphate = $Al_2(SO_4)_3$

b) Silver nitrate = $AgNO_3$

c) Magnesium oxide = MgO

d) Barium chloride = $BaCl_2$

3. Write the skeleton equation for the following word equation and then balance them.

a) Carbon + Oxygen → Carbon dioxide

b) Phosphorus + Chlorine → Phosphorus pentachloride.

c) Sulphur + Oxygen → Sulphur dioxide

d) Magnesium + hydrogen chloride → Magnesium + Hydrogen chloride

a) $C + O_2 \rightarrow CO_2$

b) $P_4 + 10\ Cl_2 \rightarrow 4PCl_5$

c) $S + O_2 \rightarrow SO_2$

d) $Mg + 2HCl \rightarrow MgCl_2 + H_2$

4. Balance the following chemical equation.

a) $Na + O_2 \rightarrow Na_2O$ **b) $Ca + N_2 \rightarrow Ca_3N_2$**

c) $N_2 + H_2 \rightarrow NH_3$ **d) $CaCO_3 + HCl \rightarrow CaCl_2 + CO_2 + H_2O$**

e) $Pb(NO_3)_2 \rightarrow PbO + NO_2 + O_2$

a) $4Na + O_2 \rightarrow 2Na_2O$

b) $3Ca + N_2 \rightarrow Ca_3N_2$

c) $N_2 + 3H_2 \rightarrow 2NH_3$

d) $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$

e) $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2$

VI. Higher Order Thinking Questions.

1. Why does a light paddle wheel placed in the path of cathode rays begin to rotate, when cathode rays fall on it?

It is because the small particles of the cathode rays (electrons) have mass and energy. This energy is used in rotating the paddle wheels.

2. How can we prove that the electrons carry negative charge?

J.J. Thomson found that cathode rays were attracted by the positively charged plate and repelled by the negatively charged plate. This led him to the conclusion that the cathode rays (electrons) were made of negatively charged particles.

3. Ruthresh, Hari, Kanishka and Thahera collected different samples of water from a well, a pond, a river and underground water. All these samples were sent to a testing laboratory. The test result showed the ratio of hydrogen to oxygen as 1:8.

a) What conclusion would you draw from the above experiment?

b) Which law of chemical combination does it obey?

- Water obtained from different sources like a well, a pond, a river and underground water will always consist of the same two elements hydrogen and oxygen in the ratio 1 : 8 by mass.
- It obeys the law of constant proportion.