Atomic Structure

1. **What are the main products of a matter?**
   Ans, Matters are built of elementary particles.
   i.e. Atoms, Molecules, Ions

2. **What is Atom?**
   Ans. An atom is the smallest constituent unit of ordinary matter that constitutes a chemical element.
   Atoms are not capable of independent existence.
   Ex: 'O'- Oxygen Atom.
   'H'- Hydrogen Atom

3. **What is Molecule?**
   Ans. A molecule is the smallest particle of a substance which is capable of independent existence & retains the characteristics of the substances.
   A molecule is formed with the atoms of same element and different elements combine.
   Ex: O+O= O_2
   H+O+H = H_2O

4. **What is the basic structure of Atoms?**
   Ans. Atoms are built up of two subatomic particles. They are Nucleus and Orbit or Shell.
   Nucleus is in the centre of atoms. It contains Protons and Neutrons.
   Orbits or Shells are imaginary paths in which electrons revolve around the nucleus.

5. **What is Atomic Number?**
   Ans. Atomic Number is the number of protons present in an Atom.

6. **What is the difference between Dalton's Atomic Theory and Modern Atomic Theory?**
   Ans.

Dalton's Atomic Theory	Modern Atomic Theory
Atoms are indestructible	Atoms are destructible.
An atom is the indivisible, smallest particle of an element.	Atoms are divisible and consists of protons, electrons, and neutrons.
Atoms of the same element are alike in all respects.	Atoms of the same element may not be alike as per the modern theory.

7. **What is Atomicity?**
   Ans. Number of atoms present in a molecule of an element is called Atomicity.

8. **What is Monoatomic Molecule?**
   Ans. A molecule of an element composed of only one atom is known as Monoatomic Molecule.
   Ex: Helium (He)
   Sodium (Na)

9. **What is Diatomic Molecule?**
   Ans. A molecule of an element composed of only two atoms is known as Diatomic Molecule.
   Ex: Hydrogen (H_2), Oxygen (O_2)

10. **What is Triatomic Molecule?**
    Ans. A molecule of an element composed of only three atoms is known as Triatomic Molecule.
    Ex: Ozone (O_3)

11. **What is Polyatomic Molecule?**
    Ans. A molecule of an element composed of more than three atoms is known as Polyatomic Molecule.
    Ex: Phosphorous (P_4)
    Sulphur (S_4)

12. **What is Radical?**
    Ans. A radicle is a single atom of an element or a group of atoms of different elements behaving a single unit and with a charge on the group.
    It can take part unsplit in a chemical reaction and retains its identity.
    Ex: NH_4^+ Ammonium Radical.

13. **Radicals are how many types?**
    Ans. Radicals are two types:
    a. Positive Radicals
    b. Negative Radicals

14. **What are Positive Radicals?**
    Ans. Positive Radical is a radical which behaves like hydrogen or a metal in a chemical reaction.
    Ex: Ammonium Radical (NH_4^+)

15. **What are Negative Radicals?**
    Ans. Negative Radical is a radical which behaves like a nonmetal in a chemical reaction.
    Ex: Carbonate Radical (CH_3^-)

16. **What are Basic Radical and Acid Radicals?**
    Ans. A compound made up with a positive pate and negative part.
    The positive part is called Basic Radical and the negative part is called Acid Radical.
    Ex: Sodium Chloride (NH_4Cl) is a compound which made up with positive part NH_4^+ and negative part Cl^-
    So NH_4^+ is Basic Radical and Cl^- is Acid Radical.

17. **What is Ion?**
    Ans. A salt made up with positive and negative part. These are called Ions.

18. **Ions are how many types?**
    Ans. Ions are two types:
    a. Cations
    b. Anions

19. What are Cations and Anions?

Ans. The positively charged ions are called Cations and negatively charged ions are called Anions.

Ex: Sodium Chloride (NaCl) is a salt. Which consists of Na^+ and Cl^- ions.

Na^+ Ion is Cation. And Cl^- Ion is Anion.

20. What is Valency?

Ans. Valency is an element or radical is the number of hydrogen atoms which can combine with a displace one atom of the element or radical forming a compound.

21. What are the characteristics of Valency of an element?

Ans. The characteristics of Valency of an element are

a. Valency is always a whole number
b. Valency of metal is positive
c. Valency of Nonmetal is negative
d. Monovalent element has valency is one (K^+)
e. Divalent element has valency is two (Zn^{2+})
f. Trivalent element has valency is three (Al^{3+})
g. Certain element exhibit has variable valency i.e. have more than one valency. (Fe^{2+}, Fe^{3+})

22. What is Formula?

Ans. A formula is a short way of representing the molecule of an element or a compound.

23. What should be known to write a chemical formula?

Ans. For writing a chemical formula the following should be known

a. Symbols
b. The combining capacity of an element with hydrogen.

24. What are the rules to write Chemical Formulae with an example?

Ans. Let us take the example of water. Water molecules are made of hydrogen atoms and oxygen atoms. The combining capacity of oxygen is 2 and that of hydrogen is 1.

The basic rules to write the Chemical Formulae are

i. Write the symbols of the elements that form the compound, with their valency under them.

H O
1 2

ii. Interchange the valences and write them as subscripts.

H O
1 2
H_2 O_1

iii. Omit 1 as subscript.

H_2O

iv. If the subscripts of the elements are the same, they may be generally be omitted.

Ex: MgO

Mg O
2 2
MgO

25. What is Chemical Equation?

Ans. A chemical Equation is a shorthand form representing the result of a chemical change.

26. What is Chemical Reaction?

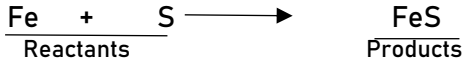
Ans. A chemical reaction is a process that leads to the chemical transformation of one set of chemical substances to another.

27. What are Reactants?

Ans. The substances which take part in the chemical reaction are called Reactants.

28. What are Products?

Ans. The substances which are formed as a result of the chemical reaction are called Product.



29. In modern periodic table how elements are arranged?

Ans. In modern Periodic Table elements are arranged by increasing order of atomic number.

There are seven horizontal rows or Periods and Eighteen Vertical Columns or Groups in Modern Periodic Table.

30. What is Group Number?

Ans. Group Number signifies number of electrons in the outer shell an atom of the element.

Number of electrons on the outer shell of an element in a group is same.

Hence all the elements in the same group of a periodic table have same valency and similar chemical property.

Short Question

1. _____ is the smallest unit of Element.
2. _____ of an element is not capable of independent existence.
3. _____ made up of one kind of atom.
4. _____ is the smallest part of a Compound.
5. _____ of an element is capable of independent existence.
6. _____ is a single atom of an element or a group of atoms of different elements behaving a single unit and with a charge on the group.
7. NH_4^+ is an example of _____.
8. _____ of an Atom is positively charged.
9. _____ of an Atom is negatively charged.
10. _____ of an Atom is neutral in charge.
11. In the modern periodic table elements are arranged _____.
12. _____ discovered Protons.
13. _____ discovered Electrons.
14. _____ discovered Atomic Nucleus.
15. _____ discovered Neutrons.
16. Number of atoms present in a molecule of an element is called _____.
17. Phosphorous is a _____ molecule.
18. Example of Triatomic Molecule is _____.
19. All _____ gases are Monoatomic.
20. Oxygen is _____ molecule.
21. _____ behaves like hydrogen or a metal in a chemical reaction.
22. _____ behaves like a nonmetal in a chemical reaction.
23. Positively charged ion in Salt is called _____.
24. Negatively charged ion in Salt is called _____.
25. _____ is a shorthand form representing the result of a chemical change.
26. _____ made Modern Periodic Table.
27. In modern Periodic Table Number of Periods are _____ and the number of Groups are _____.
28. _____ signifies number of electrons in the outer shell an atom of the element.

1) Atom
2) Atom
3) Element
4) Molecule
5) Molecule
6) Radicle
7) Radical
8) Proton
9) Electron
10) Neutron
11) by increasing order atomic number.
12) Goldstein
13) J.J Thomson
14) Rutherford
15) James Chadwick
16) Atomicity.
17) Polyatomic
18) Ozone
19) Inert
20) Diatomic
21) Positive Radical
22) Negative Radical
23) Cation
24) Anion
25) Chemical Equation
26) Mandeleff
27) Seven, Eighteen
28) Group Number