Q 1A:

I. **Law of Definite Proportions**

A given compound always contains exactly the same proportion of elements by weight.

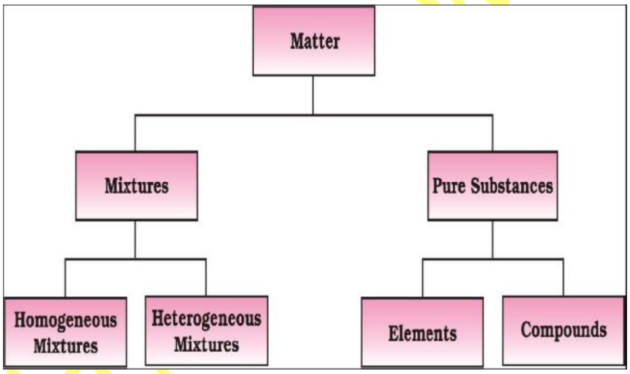
II. **Law of Multiple Proportions**

if two elements can combine to form more than one compound, the masses of one element that combine with a fixed mass of the other element, are in the ratio of small whole numbers.

Q 1B

I. Mass of One atom of Sodium=?	ii. Mass of One Molecule of Ozone=?
Solution:- 6.022×10^{23} atoms of Sodium=23 gms	Molecular mass of Ozone=O_3=(3 x 16)=48
One atom of Sodium= X gm	6.022×10^{23} Molecule of Ozone =48 gms
$X = 23 / (6.022 \times 10^{23})$	One Molecule of Ozone=x gm
One atom of Na will weigh =3.819 x 10^{-23} gms	$X = 48 / (6.022 \times 10^{23})$
	Mass of One Molecule of Ozone =7.97 x 10^{-23} gms

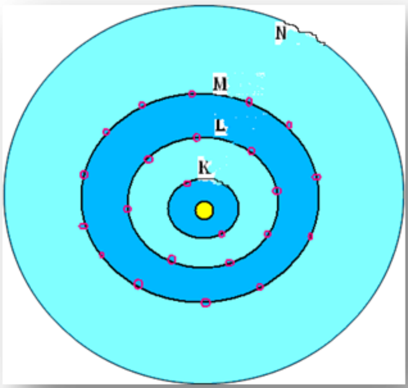
Q 1C **Flow sheet diagram showing Classification of Matter**



Q 2A

Element	**symbol**	**%**	**At mass**	**Relative No of moles**	**Simple Ratio**	**Simple Whole No Ratio**
Silver	Ag	70.6	108	$\frac{70.6}{108} = 0.6537$	$\frac{0.6537}{0.3047} = 2.14$	**2**
Sulphur	S	9.75	32	$\frac{9.75}{32} = 0.3047$	$\frac{0.3047}{0.3047} = 1$	**1**
Oxygen	O	19.6	16	$\frac{19.6}{16} = 1.225$	$\frac{1.225}{0.3047} = 4.02$	**4**
Empirical formula= Ag_2SO_4						

Q 2B Postulates of BOHR'S MODEL FOR HYDROGEN ATOM (any Two)



I. The electron in the hydrogen atom can move around the nucleus in a circular path of fixed radius and energy. These paths are called orbits, stationary states or allowed energy states. These orbits are arranged concentrically around the nucleus.

II. The energy of an electron in the orbit does not change with time. However, the electron will move from a lower stationary state to a higher stationary state when required amount of energy is absorbed by the electron or energy is emitted when electron moves from higher stationary state to lower stationary state. The energy change does not take place in a continuous manner.

III. The frequency of radiation absorbed or emitted when transition occurs between two stationary states that differ in energy by ΔE, is given by :

$$\nu = \frac{\Delta E}{h} = \frac{E_2 - E_1}{h}$$

Where E_1 and E_2 are the energies of the lower and higher allowed energy states respectively. This expression is commonly known as Bohr's frequency rule.

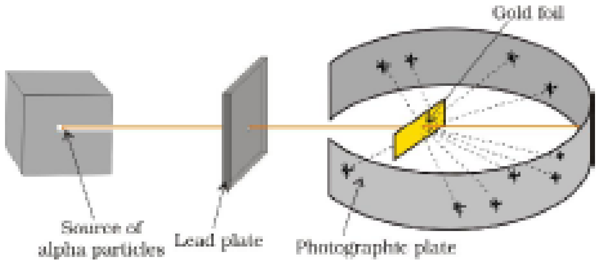
IV. The angular momentum of an electron in a given stationary state can be expressed as in equation

$$m_e v r = n . \frac{h}{2\pi} \quad n = 1,2,3.....$$

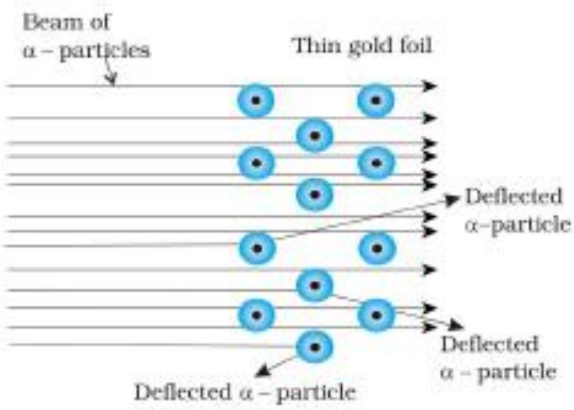
Thus an electron can move only in those orbits for which its angular momentum is integral multiple of $h/2\pi$ that is why only certain fixed orbits are allowed

Q 2C In a chemical Reaction the reactant which is present in the lesser amount gets consumed after sometime and after that no further reaction takes place whatever be the amount of the other reactant present. Hence, the reactant which gets consumed, limits the amount of product formed and is, therefore, called the **limiting reagent**.

Q 3A



A. Rutherford's scattering experiment



B. Schematic molecular view of the gold foil

Observations made by Rutherford based on his scattering experiment

(i) most of the α– particles passed through the gold foil undeflected.
(ii) a small fraction of the α–particles was deflected by small angles.
(iii) a very few α– particles (~1 in 20,000) bounced back, that is, were deflected by nearly 180^0

Q 3B **Ca =20** E.C= $1s^2\, 2s^2 2p^6 3s^2 3p^6 4s^2$ Or [Ar] $4s^2$

N shell = $4s^2$ Quantum No for both these electrons are as follows

$$n=4,\ l=o,\ m_l=0,\ m_s = +1/2$$

$$n=4,\ l=o,\ m_l=0,\ m_s = -½$$

Q 3C **<u>Properties of Cathode rays</u>** (any Two)

I. The cathode rays start from cathode and move towards the anode.
II. These rays themselves are not visible but their behaviour can be observed with the help of certain kind of materials (fluorescent or phosphores)
III. In the absence of electrical or magnetic field, these rays travel in straight lines
IV. In the presence of electrical or magnetic field, the behaviour of cathode rays are similar to that expected from negatively charged particles, suggesting that the cathode rays consist of negatively charged particles, called electrons.
V. The characteristics of cathode rays (electrons) do not depend upon the material of electrodes and the nature of the gas present in the cathode ray tube.

Q 4A 3d & 2s

Q 4B In a Sixth period the Orbital's available for filling the electrons are **6s 4f 5d** and **6p** The order in which the energy of the available orbital's **6s 4f 5d 6p** increases as 6*s* < 4*f* < 5d<6p. The total number of orbitals available is (1+7+5+3)=16. The maximum number of electrons that can be accommodated is **32**; and therefore 32 elements are there in the 6^{th} period.

Q 4C

I. **Modern Periodic Law**

The physical and chemical properties of the elements are periodic functions of their atomic numbers.

II. Ununoctium

OR

II. In the Second Period First element= **Lithium** & Last element=**Neon**

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