Past paper Questions

- *Explain the shape of water molecule with the help of Molecular Orbit Theory, also draw its orbit diagram. (CSS-2016)*
- *What are the gamma rays? Explain their applications. (CSS – 2016)*
- *Why do atoms form bonds? Name three major types of chemical bonds (CSS-2019)*
- *What is natural radioactivity? How it is different from the artificial radioactivity? (CSS – 2020)*

Q1)

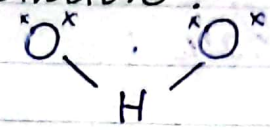
Ans) **Shape of Water Molecule with the Help of Molecular Orbit Theory:**

Water Molecule:

Water molecule is consist of two Hydrogen atom and one Oxygen atom. Combine together by covalent bonding

Shape of Water Molecule:

Molecular Structure:



Shape: V shape due to lone pair of oxygen

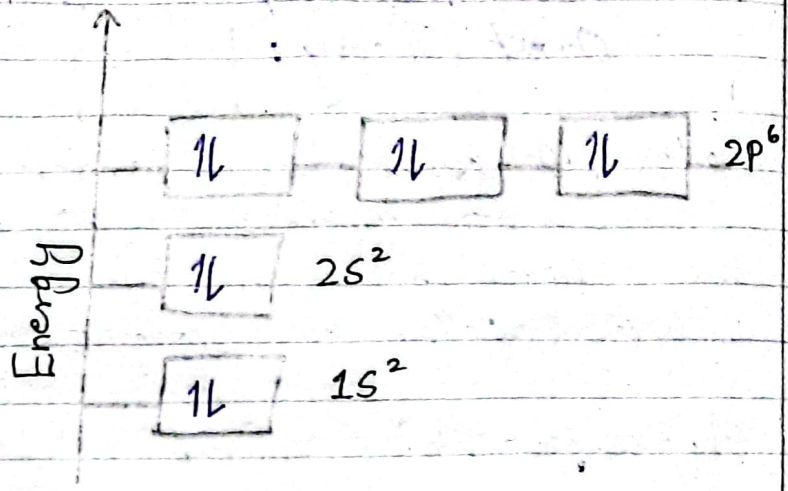
Polarity: Polar molecule; partial negtive charge oxygen and partial positive charge hydrogen

Orbital Diagram of Water Molecule

Electronic Configuration of H_2O:

$1s^2, 2s^2, 2p^6$

- Orbital Diagram according to the Molecular Orbit Theory:



(Q2)

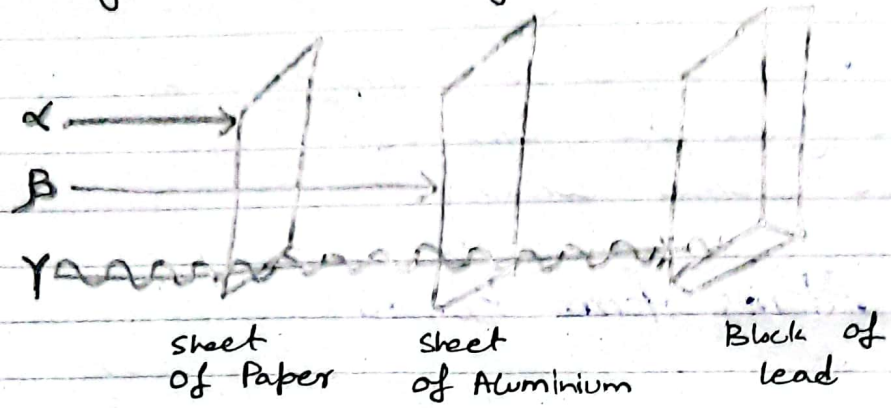
Ans) Gamma Rays:

Gamma Rays are the electromagnetic rays, which does not required any medium to propagate

Properties of Gamma Rays

1. It does not required any medium
2. Travel with the speed of light
3. They produce through nuclear decay
4. Gamma Rays wave length range is below 100 pm and frequency is greater than 10 Hz
5. Gamma can pass through most types of material, only hard type material like lead can stop them

Diagram of passing of Gamma Rays:



α = Alpha rays
β = Beta rays
γ = Gamma rays

Applications of Gamma Rays

1. It is used in medical field for the treatment of cancer cell
2. It is used for security purposes
3. Gamma rays are used in radition monitoring of nuclear power plant
4. It is used in handleing radio active waste
5. Gamma are used to study cosmic phenmena.

Q3

Ans) **Atomic Bonding:**

Any share or transfer of electrons from one atom to another is knows as atomic bonding

Why Atoms form Bonds:

Atoms form bonds to gain stability. The stability comes by completing their valence shell of electrons, according to the Octet Rule.

Example:

1) Na CL

Na = Sodium

CL = Chlorine

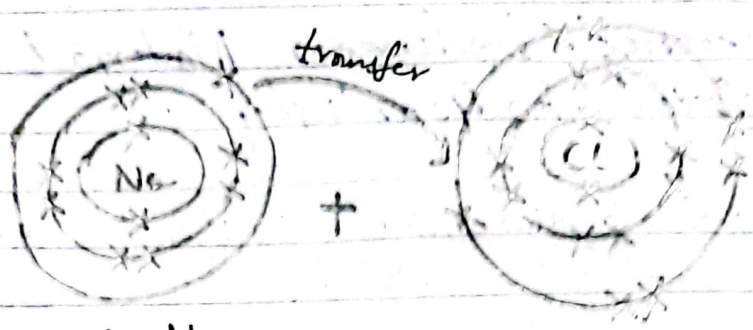
Sodium and Chlorine ~~share~~ transfer their valence ~~sho~~ shell electrons to gain stability.

Na has 11 electrons

Cl has 17 electrons

Cl needs 1 electron to complete its valence shell and ~~Chlorine~~ Sodium has one extra electrons. So, Sodium transfer one electron to chlorine; ~~so~~. they both can gain stability

Diagram:



Atom of Na

Atom of CL

By transfer, they both can get stability according to the octet rule.

(Q4)

Ans) ~~Natural~~

Name of Three Major Types of Chemical Bonds

The names of chemical bonds are

1. Ionic Bond
2. Covalent Bond
3. Co-oridnate covalent Bond

(Q4)

Ans) **Natural Radioactivity:**

Natural radioactivity is a phenomena that occurs when ~~u~~stable atomic nuclei spontaneously decay and emits ~~rad~~ particles and ~~rad~~ electromagnetic raditions

Examples: Randon Gas, Uranium 238, etc

Difference between Natural and Artificial Radioactivity

Natural Radioactivity	Artificial Radioactivity
It occurs naturally by atomic nuclei decay	It occurs by human activity in laboratory or nuclear reactor
It has constant rate of emission i.e half life	Controlled amount of emission
Examples are Uranium, random gas	Examples are Cobalt 60, Iodine-131
Use in medical imaging	Cancer treatment, and scientific research

The main difference, how natural radioactivity is different is it occurs naturally in the earth crust. While Artifical is done in laboratory for uses.