

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)

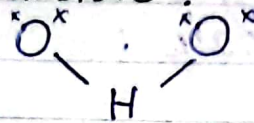
Ans) Shape of Water Molecule with the Help of Molecular Orbital Theory:

Water Molecule:

Water molecule consists of two Hydrogen atoms and one Oxygen atom. They combine together by covalent bonding.

Shape of Water Molecule:

Molecular Structure:

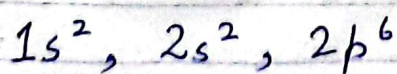


Shape: V shape due to lone pair of oxygen

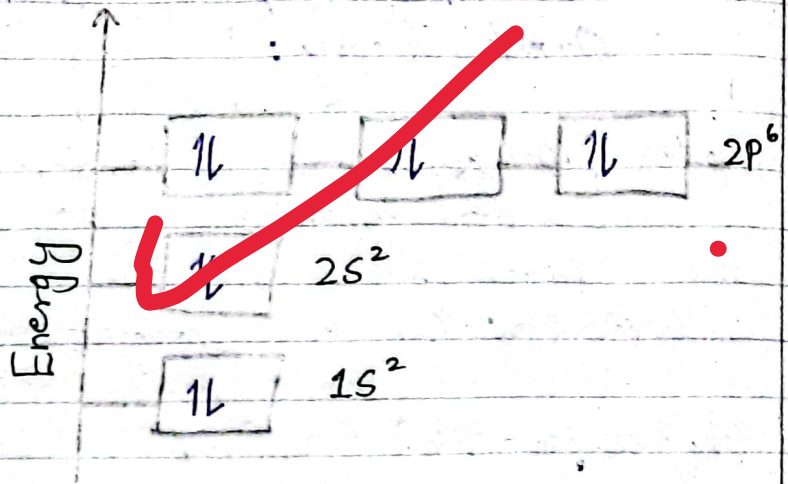
Polarity: Polar molecule; partial negative charge oxygen and partial positive charge hydrogen

Orbital Diagram of Water Molecule

Electronic configuration of H_2O :



- Orbital Diagram according to the Molecular Orbit Theory:



Q2)

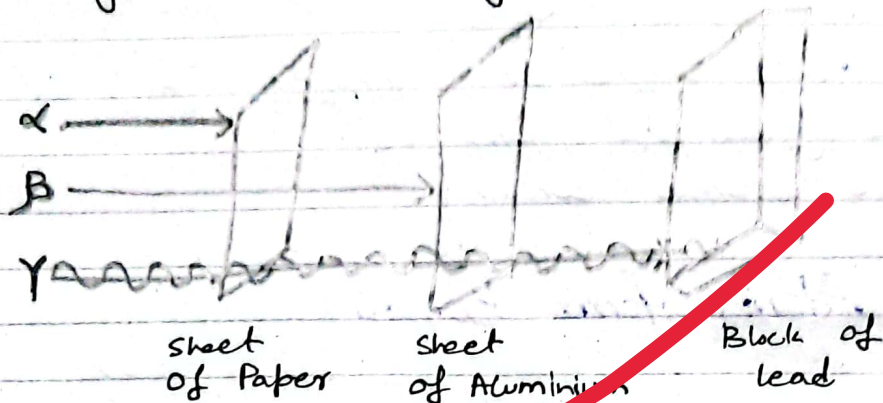
Ans) Gamma Rays :

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^{14} Hz
5. Gamma can pass through most types of materials, 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 radiation monitoring of nuclear power plant
4. It is used in handling radio active waste
5. Gamma are used to study cosmic phenomena.

Q3

Ans) Atomic Bonding:

Any share or transfer of electrons from one atom to another is known 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) NaCl

Na = Sodium

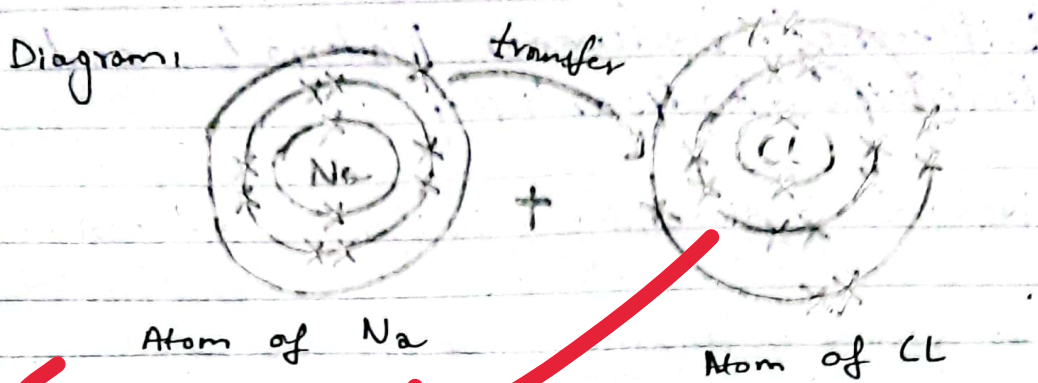
Cl = Chlorine

Sodium and Chlorine ^{transfer} share their valence 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.



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

~~Q3)~~
Q3) Natural

Name of Three Major Types of Chemical Bonds

- The names of chemical bonds are
1. Ionic Bond
 2. Covalent Bond
 3. Co-ordinate covalent Bond

Briefly explain each

Q4)

Ans) Natural Radioactivity:

Natural radioactivity is a phenomena that occurs when unstable atomic nuclei spontaneously decay and emits ~~rad~~ particles and ~~rad~~ electromagnetic radiations.

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, radon 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 Artificial is done in laboratory for uses.

Good answers!!