

Explain the mechanism of fiber optic cable for signal. Explain its construction.

## Fiber optics

Definition: Fiber optics are strands of optically pure glass which are as thin as human hair. These fibers transmit digital information in the form of light signals. It works on the principle of total internal reflection to carry digital information.

### Mechanism

#### Total internal reflection:

When light particles (photons) enter into fiber cable then light signals & repeatedly bouncing off the wall which allow these signals to keep in the core. This principle help optic fiber to use for long distance. Light signals travel down the fiber cable in a zig-zag path.

Explain this part in a bit more detail.

### Construction

Fiber optics are consisting of following major components

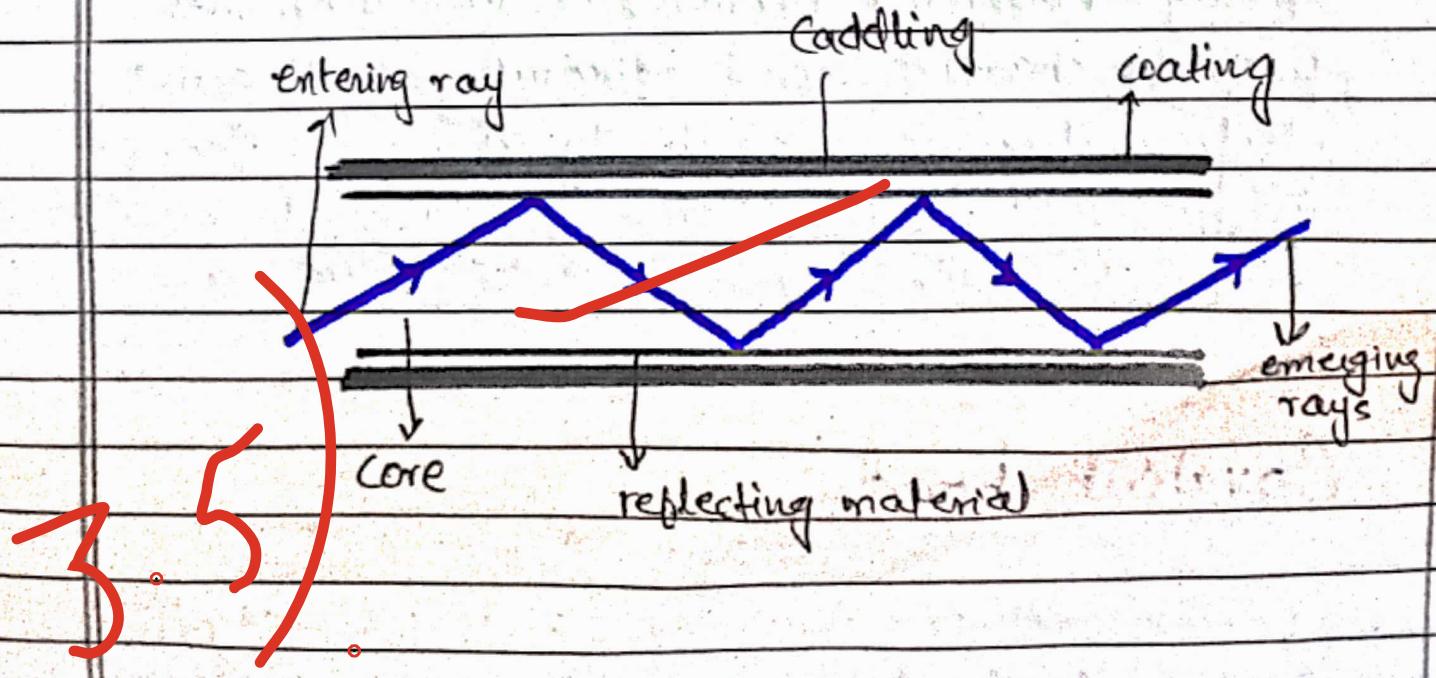
- 1- core of the cable
- 2- caddling
- 3- coating / outer buffer
- 4- Reflecting material.

Core: It is the internal part of the fiber optic cable made up of pure glass or plastic. Its refractive index is lower as compared to Cadding.

Cadding: It surrounds the core. Its refractive index is greater as compare to core helps light signals to remain in core and prevent from escaping.

Coating: It act as a an outer buffer layer. It also helps light signals to keep within the core.

Reflecting material: It help light signals to reflect within the core in a zig-zag path.



What is difference between the ionic and covalent bonding?  
Give examples.

## Ionic bond

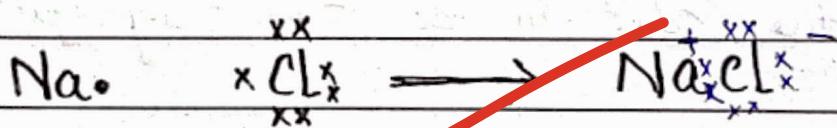
These bonds are formed between the metal and non-metals in ionic compounds.

Ionic bonds can be defined as;

~~"Types of bonds which are formed by complete sharing of electron from metal to non-metal."~~

### Example of ionic bond:

Ionic bonds are formed between metal and non-metal such as Sodium chloride,



after transferring electron, Sodium becomes positively charged and chlorine which gains electron becomes negatively charged. Because negative and positive charges attract towards each other; they form a bond which is known as ionic bond.

## Covalent bond

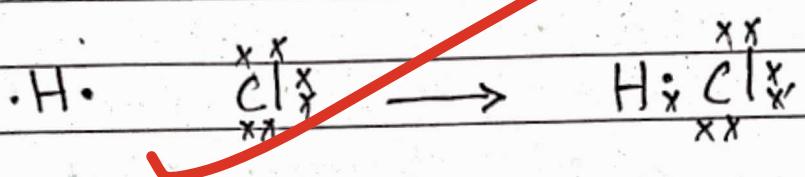
Covalent bonds are formed between two metals in covalent compounds. Covalent compounds can be

defined as:

such types of bond which are formed by mutual sharing of electron between metals is called covalent bonds

## Example of covalent bond

Chemical bond between Hydrochloric acid is the covalent bond.



Hydrogen and chlorine forms a covalent bond by mutually sharing electron.

### Ionic bond

- complete mutual sharing
- high conductivity

- between metals and non-metals

- Soluble in water

- example:  $\text{NaCl}$ ,  $\text{MgO}$

### covalent bond

- <sup>partial</sup> complete sharing
- lower conductivity

- between two metals

- insoluble in water

- $\text{H}_2$ ,  $\text{O}_2$