FIBER OPTICS

Fiber optics is the field of applied science and engineering connected with the design and application of optical fiber. The father of fiber optics is Narinder Singh Kapany

OPTICAL FIBERS

An optical fiber is a transparent flexible fiber made by drawing glass (or silica) or plastic to a diameter slightly thicker than that of the human hair strand

MAKE-UP OF OPTICAL FIBERS

Optical fibers are made up of a core surrounded by a transparent cladding material with a lower index of refraction. Light is kept in the core by the phenomenon of total internal reflection which causes the fiber to act as a waveguide.

Fibers that support many propagation paths or transverse modes are multi-mode fibers while those that support one single mode are called single-mode fibers.

Multi-mode fibers generally have a wider core diameter and are used for short distance communication links and for applications where higher power has to be transmitted, single-mode fibers are used since they are used for communication links longer than 1000m.

Yellow cables in optical fibers are single mode fibers

Orange cables are multimode fibers

Aqua cables are also multimode fibers

MAKE-UP OF THE CORE

The core and the cladding can be made from Silicon, Silica dioxide, pure glass or plastic

USES OF OPTICAL FIBERS

1. They are used as a means of transport to transmit light between two ends of the fiber
2. They are used in imaging and illumination (i.e. fiberscope)
3. They are used in creating fiber optic sensors
4. Fiber optic lasers
5. They are also used in computer networking

USES OF FIBER OPTICS IN COMMUNICATION

1. They permit transmission over long distances
2. They transmit energy at higher bandwidths (data transfer rate) than electric cables

ADVANTAGES OF OPTICAL FIBERS COMPARED TO METAL WIRES

Fiber optics are used instead of metal wires because signals travel along them with less loss

Optical fibers are immune to electromagnetic interference which is a problem of metal wires.