# NIELIT Gorakhpur

**Course Name: O Level (2nd Sem)** **Subject: ICT**
**Topic: Tranamission media[continued]** **Date: 12-05-2020**

## Chapter 3rd [Networking Concepts]

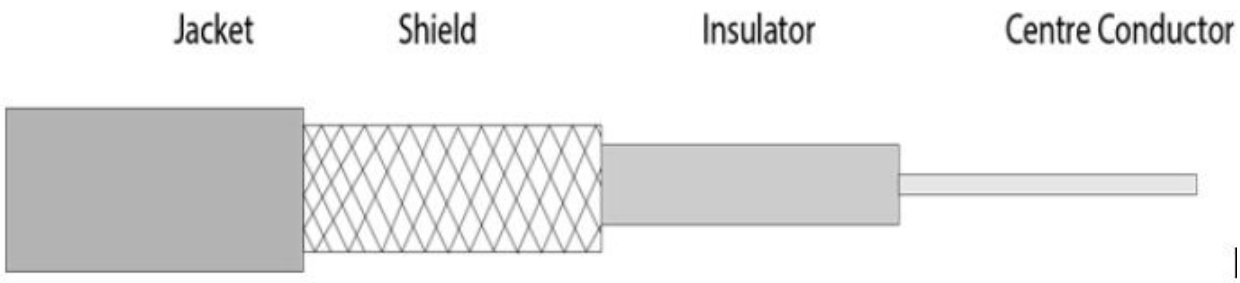
**UTP Categories**:-Unshielded Twisted Pair (UTP) cable is most certainly by far the most popular cable around the world. UTP cable is used not only for networking but also for the traditional telephone (UTP-Cat 1). There are different types of UTP categories and, depending on what user want to achieve, user would need the appropriate type of cable. UTP-CAT5e is the most popular UTP cable which came to replace the old coaxial cable that was not able to keep up with the constant growing need for faster and more reliable networks.

| UTP Category | Data rate | Max. Length | Cable Type | Application |
|---|---|---|---|---|
| CAT4 | Up to 16Mbps | 100m | Twisted Pair | Token Ring Network |
| CAT5 | Up to 100Mbps | 100m | Twisted Pair | Ethernet, FastEthernet,Token Ring |
| CAT5e | Up to 1Gbps | 100m | Twisted Pair | Ethernet, FastEthernet,Gigabit Ethernet |
| CAT6 | Up to 10Gbps | 100m | Twisted Pair | GigabitEthernet, 10G Ethernet(55 meters) |
| CAT6a | Up to 10Gbps | 100m | Twisted Pair | GigabitEthernet, 10G Ethernet(55 meters) |
| CAT7 | Up to 10Gbps | 100m | Twisted Pair | GigabitEthernet, 10G Ethernet(100 meters) |

## Coaxial Cable

Coaxial cable has two wires of copper. The core wire lies in the center and it is made of solid conductor. The core is enclosed in an insulating sheath. The second wire is wrapped around over the sheath and that too in turn encased by insulator sheath. This all is covered by plastic cover. Because of its structure, the coax cable is capable of carrying high frequency signals than that of twisted pair cable. The wrapped structure provides it a good shield against noise and cross talk. Coaxial cables provide high bandwidth rates of up to 450 mbps. Coaxial cable is of two types:

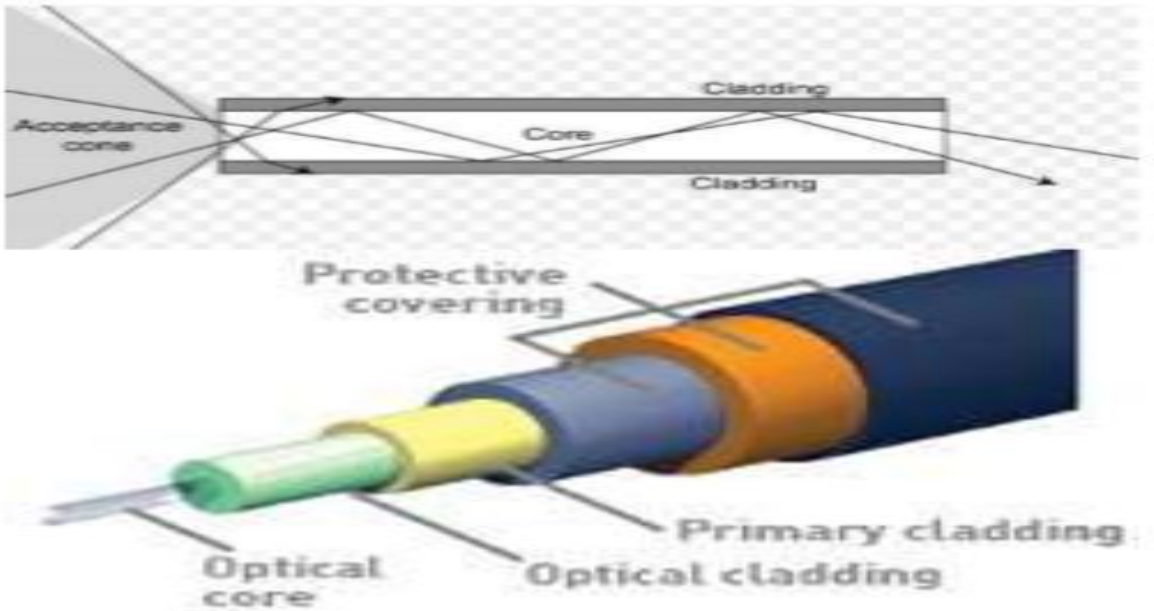
- **Baseband transmission**: It is defined as the process of transmitting a single signal at high speed.
- **Broadband transmission:** It is defined as the process of transmitting multiple signals simultaneously.




## Fiber Optics

Fiber Optic works on the properties of light. When light ray hits at critical angle it tends to refracts at 90 degree. This property has been used in fiber optic. The core of fiber optic cable is made of high quality glass or plastic. From one end of it light is emitted, it travels through it and at the other end light detector detects light stream and converts it to electric data.

Fiber Optic provides the highest mode of speed. It comes in two modes, one is single mode fiber and second is multimode fiber. Single mode fiber can carry a single ray of light whereas multimode is capable of carrying multiple beams of light.



## Basic elements of Fibre optic cable:

**Core:** The optical fibre consists of a narrow strand of glass or plastic known as a core. A core is a light transmission area of the fibre. The more the area of the core, the more light will be transmitted into the fibre.

**Cladding:** The concentric layer of glass is known as cladding. The main functionality of the cladding is to provide the lower refractive index at the core interface as to cause the reflection within the core so that the light waves are transmitted through the fibre.

**Jacket:** The protective coating consisting of plastic is known as a jacket. The main purpose of a jacket is to preserve the fibre strength, absorb shock and extra fibre protection.

## Following are the advantages of fibre optic cable over copper:

**Greater Bandwidth:** The fibre optic cable provides more bandwidth as compared copper. Therefore, the fibre optic carries more data as compared to copper cable.

**Faster speed:** Fibre optic cable carries the data in the form of light. This allows the fibre optic cable to carry the signals at a higher speed.

**Longer distances:** The fibre optic cable carries the data at a longer distance as compared to copper cable.

**Better reliability:** The fibre optic cable is more reliable than the copper cable as it is immune to any temperature changes while it can cause obstruct in the connectivity of copper cable.

**Thinner and Sturdier:** Fibre optic cable is thinner and lighter in weight so it can withstand more pull pressure than copper cable.

## Assignment:-

1-Explain UTP Categories?

2-Explain advantages of fibre optic cable over copper?