



Course: Data communication & Computer Network

Submitted by:

Student Name: Suman Devkota

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Submitted to:

Er. Kiran K.C.

Department of Bachelor of Computer Application

1. Why is Fiber Optics Cable considered as the most efficient transmission medium? Explain with Reasons.

Fiber optic cable is a networking cable that is made up of strands of glass fibers enclosed in an insulated casing.

It is also called as optical-fiber cable. It is used for high-performance long-distance data networking. Fiber optic lines have a higher bandwidth than coaxial cables and can carry data over longer distances. A fiber optic cable is made up of one or more glass strands that are only slightly thicker than a human hair. The middle of each strand is known as the core, and it serves as the path for light to travel. The core is surrounded by cladding, which is a layer of glass that reflects light inward to reduce signal loss and allows light to pass through bends in the cable.

Fiber optic cables have a greater bandwidth (180 to 370 THz) than any other physical media. Because fiber optic cables carry data in the form of light.

When copper cables are strung in parallel over long distances, parasitic electrical impulses interfere with data transmission, resulting in either data loss or inaccurate information being transferred.

Co-axial cables required repeaters to transmit data over long distance. But Fiber cables are used for transmitting data over long distances in the form of light. This cable does not need any type of repeaters to transmit data over long distances.

Fiber Optic cables are much lighter in weight than copper cables. So it is easy for installation.

WIRED TRANSMISSION MEDIA			
	Twisted Pair Cable	Coaxial Cable	Fiber Optics Cable
Bandwidth/Frequency	Up to 4700MHz	7500Mhz	Up to 4700MHz
Transmission Speed	10Mbps-100Mbps	10Mbps	100Mbps-1Gbps
Distance Coverage	Up to 100 meters	Up to 500 meters	Up to 80 km
Real Time Applications	Telephone Lines	Old Television Lines	Internet connection
Advantages	Cost effectively	Very Durable	Perform in long distances
Disadvantages	Lower durability	Signal leak	Expensive

WIRELESS TRANSMISSION MEDIA			
	Radio Waves	Microwave	Infra-red
Bandwidth/Frequency	3KHz-1GHz	1GHz-300GHz	300GHz-400GHz
Transmission Speed	299,775km/s	300Mbps-1Gbps	15Kbps-16Mbps
Distance Coverage	Up to 100 km	Up to 100 meters	700 nm(nanometer) to 1 mm(millimeter)
Real Time Applications	Radio communication	Micro-Wave	Remote control
Advantages	The transmitter and receiver do not need to be in the line of sight	Cheaper	Low power consumption
Disadvantages	Cannot transmitted huge amount of data	Limited bandwidth	Line of sight