Data Communication and Computer network

Name: **Astha Shrestha**

Assignment 3: -

Q1) Why is Fiber optics cable considered as the most efficient transmission medium" Explain with reasons.

Ans:

Fiber optics cable is considered as the most efficient transmission medium because its core consists of optic fibers rather than copper and data is transmitted by light rather than electronic signal which make them advantageous for long-distance communications. It provides a much higher bandwidth allowing more data to be delivered as well as the maximum distance of fiber optic cabling is measured in miles, rather than meters. Its type multimode connections have a larger core diameter which lets multiple modes of light transmit at once. The number of light reflections through the core increase as they travel, allowing more data to pass through.

Fiber optics cables are much lighter and smaller physical size due to their thin strand of glass enclosed in a glass tube. Fiber optics cables do not suffer from any stray interference pickup that occurs with coaxial cables. It can run at a speed of 40Gbps and even 100 Gbps. It supports extremely high bandwidth levels and less power loss and allows data transmission for longer distances. It is a physical media of transmission media. As it is the combination of optical and electrical electromagnetic energy is involved so it has better security for signals during transmission.

In conclusion, fiber optics cable is considered as the most efficient transmission medium due to its less signal degradation, light signals, low power, light weight, thinner, higher bandwidth, digital signal and so on.

Q2) Make a comparison for the following.

2.1 Wired Transmission Media			
	Twisted pair cable	Coaxial cable	Fiber optics cable
Bandwidth/ frequency	Up to 4700 MHz Low bandwidth	750 MHz (default) Moderately high	Up to 4700 MHz Very high
Transmission speed	10Mbs-100mbs	10Mbs-100Mbs	10Mbs-100Gbs
Distance coverage	Maximum distance of 100 Meters	Up to 500m	Up to 80 Km
Realtime application	Use on the telephone line	Radio Frequency	World internet, cable television
Advantage	Easy to install and setup	Used for both analog and digital	Can bundle together and perform over long distance.
Disadvantage	Transmission limit	Speed fluctuations under heavy usage	Lower durability, High cost/ expensive

2.2 Wireless Transmission Media			
	Radio wave	Microwave	Infra-red
Bandwidth/ frequency	3 KHz to 1GHz.	1 GHz to 300 GHz.	300 GHz to 400 GHz
Transmission speed	299,775 km/s	between 300 Mbps and 1 Gbps	**1**15 kbps 16 Mbps,
Distance coverage	Long distance 1mm-100km	Long distance	Up to 5 meters Short distance
Realtime application	AM and FM, Radio Television	satellite networks, and wireless LAN.	remote controls that are used for TV, DVD players
Advantage	Cheaper and travel long distance	Multiple channels available and wide bandwidth	Less power consumption, higher security.
Disadvantage	Cannot transmit a lot of data simultaneously due to low frequency.	Towers are expensive to build.	Limited bandwidth, slower speed than other transmission media.