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* Computer Network and Security (CNS) - Assignment Number - 1

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1) Compare and contrast the ISO OSI model with TCP/IP model.

→

OSI (Open System Interconnections)	TCP/IP (Transmission Control Protocol/Internet)
① OSI is a generic, protocol independent standard, acting as a communication gateway between the network and end user.	TCP/IP model is based on standard protocol around which the Internet has developed. It is a communication protocol, which allows connection of hosts over a network.
② Follows vertical approach	Follows horizontal approach.
③ OSI model has a separate presentation layer and session layer.	TCP/IP model does not have a separate presentation layer or session layer.
④ Transport layer is connection oriented.	Transport layer is both connection oriented and connection less.
⑤ Network layer is both connection oriented and connection less.	Network layer is connection less.

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OSI (Open System Interconnections)	TCP/IP (Transmission Control Protocol / Internet)
⑥ OSI model has a problem of fitting the protocol into the model.	TCP/IP model does not fit any protocol.
⑦ Protocols are hidden in OSI model and are easily replaced as the technology changes.	In TCP/IP replacing protocol is not easy.
⑧ It has 7 layers	It has 4 layers.

2) Explain this network structure.

→ There are basically two types of network: local-area networks (LAN) and wide-area networks (WAN). The main difference between the two is the way in which they are geographically distributed. Local-area network are composed of processors distributed over small areas, where as wide-area networks are composed of a network number of autonomous processors distributed over a large area (such as the India).

These differences imply major variation in the speed and reliability of the communication network, and they are reflected in the distributed operating-system design.

Local Area Networks (LAN) -

Local area network is an computer network, which is limited to a small office, single building, multiple building inside a campus etc. Typically, a local area network is a private network owned and maintained by a single organization.

The term local area network brodcast domain and subnet are used inter-changeably throughout network.

Wide-Area Networks (WAN)-

A wide area network spans over multiple geographic locations, which is composed of multiple LANs. It is nearly impossible for a small to medium organization to pull network cables between their two offices in two different countries located 1000s of kilometer away.

3) Explain different types of transmission media used in data communication.

→ Transmission media is classified into two types namely guided media and unguided media.

Guided Media-

This kind of transmission media is also known as wired otherwise bounded media. In this type, the signal can be transmitted directly and restricted in a thin path through physical links.

The main features of guided media mainly includes secure, high-speed, and used in small distances. This kind of media is classified into three types which are

i) Twisted Pair Cable
ii) Coaxial Cable
iii) Optical Fibre Cable.

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Unguided Media -
It is also known as unbounded otherwise wireless transmission media. It doesn't require any physical medium to transmit electromagnetic signals. The main feature of this media are less secure, the signal can be transmitted through air, and applicable for large distances. There are three types of unguided media which are -

i) Radiowaves
ii) Microwaves
iii) Infrared Waves.

4) Give advantages and disadvantages of fiber optics cable over metallic cable.

→ Advantages of fiber optics cable over metallic cable -

① Fiber optic cables have a much greater bandwidth than metallic cable.
② The amount of information that can be transmitted per unit time of fiber over metallic cable is way more significant.
③ Optical fibire offer low power loss than metallic cables.
④ Optic cables are immune to electromagnetic interference but metallic cables are not.
⑤ Optic cables are ~~all~~ upto 30 times smaller than metallic cables to transferrer some amount of data.
⑥ Optic cables are thinner ~~the~~ and lighter than metallic cables.
⑦ Optic cables are difficult to tap than metallic cables as it is immune to electromagnetic interference.
⑧ Optic cables has greater tensile strength than metallic cables.

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Disadvantages of fiber optics cable over metallic cable -

① Optic fiber have higher installation and maintainece cost than metallic cable.
② Optic fiber have greater cost than metallic cables.
③ Optic fiber cables can-not be curved, if curved more than few centimeters it get damaged, where as metallic cables can be curved.

5) Explain about ATM. What are the advantages of using fixed length cells.

→ Asynchronous Transfer Mode (ATM)-

It is an International Telecommunication Union-Telecommunications Standards Section (ITU-T) efficient for call relay and it transmit all information including multiple service types such as data, video, or voice which is conveyed in small fixed-size packets called cells. Cells are transmitted asynchronously and the network is connection -oriented.

Because ATM uses fixed-length cells, switching occurs at the hardware level. As a result, network latency is greatly reduced.

Advantages of using fixed length cells-

① Simpler hardware
② Facilitates parallelism
③ Finer control over queueing behavior (priorities)
④ Reduction in jitter (variabilities in delay).
⑤ Less bandwidth lose due to store and forward (when queue is empty - irrelevant on loaded network).

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