CST 303 COMPUTER NETWORKS
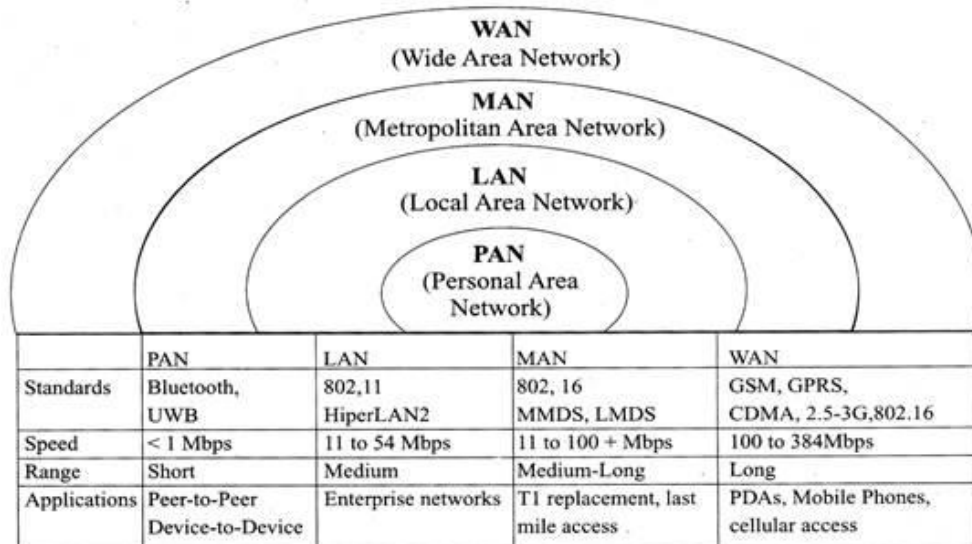
QUESTION BANK

MODULE 1

1. How are computer networks classified on the basis of physical size?

	PAN	LAN	MAN	WAN
Standards	Bluetooth, UWB	802,11 HiperLAN2	802, 16 MMDS, LMDS	GSM, GPRS, CDMA, 2.5-3G,802.16
Speed	< 1 Mbps	11 to 54 Mbps	11 to 100 + Mbps	100 to 384Mbps
Range	Short	Medium	Medium-Long	Long
Applications	Peer-to-Peer Device-to-Device	Enterprise networks	T1 replacement, last mile access	PDAs, Mobile Phones, cellular access

What are the reasons for using Layered Architecture in Computer Networks? Define the terms protocol and interface.

- The layered architecture's major goal is to split the design into tiny parts.

- Each lower layer contributes its services to the top layer, resulting in a complete collection of services for managing communications and running applications.

- It provides modularity and explicit interfaces, allowing subsystems to interact with one another.

- It ensures layer independence by offering services from the lowest to the highest layer without specifying how the services are implemented. As a result, any changes made to one layer have no effect on the other levels.
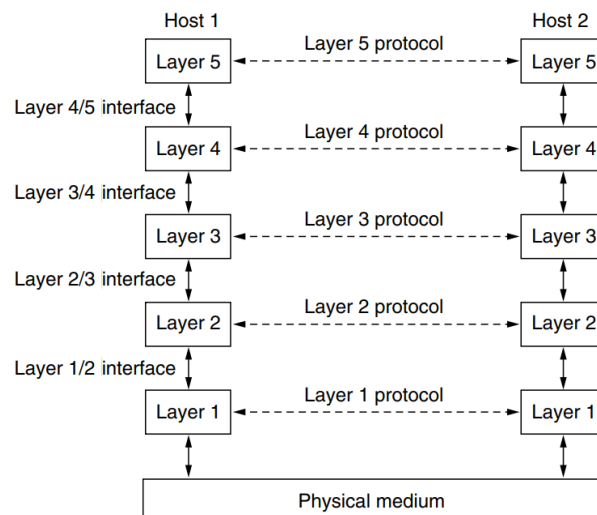
A service is a set of primitives (operations) that a layer provides to the layer above it. The service defines what operations the layer is prepared to perform on behalf of its users, but it says nothing at all about how these operations are implemented.

A protocol, is a set of rules governing the format and meaning of the packets, or messages that are exchanged by the peer entities within a layer. Entities use protocols to implement their service definitions.

The interface defines which primitive operations and services the lower layer makes available to the upper one.
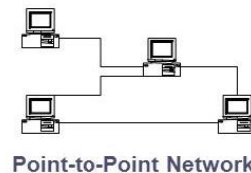
2. Describe the ISO/OSI layered architecture with the help of a neat diagram.

<refer the model question paper given>

3. What are point to point and broadcast networks?
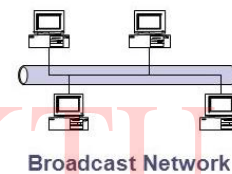
4. List the design issues of layered network software. / Design issues in a computer network. /Design issues of network layering
   - Reliability
   - Finding working path though the network/ Routing
   - Evolution of network
   - Resource allocation
   - Defending against threats
5. Compare TCP/IP Reference model and OSI Reference model.

| OSI Model	TCP/IP Model
It is developed by ISO (International Standard Organization)	It is developed by ARPANET (Advanced Research Project Agency Network).
OSI model provides a clear distinction between interfaces, services, and protocols.	TCP/IP doesn't have any clear distinguishing points between services, interfaces, and protocols.
OSI refers to Open Systems Interconnection.	TCP refers to Transmission Control Protocol.
OSI uses the network layer to define routing standards and protocols.	TCP/IP uses only the Internet layer.
OSI follows a vertical approach.	TCP/IP follows a horizontal approach.
OSI layers have seven layers.	TCP/IP has four layers.
In the OSI model, the transport layer is only connection-oriented.	A layer of the TCP/IP model is both connection-oriented and connectionless.
In the OSI model, the data link layer and physical are separate layers.	In TCP, physical and data link are both combined as a single host-to-network layer.
Session and presentation layers are a part of the OSI model.	There is no session and presentation layer in the TCP model.

<Draw the layers also>

6. Distinguish between switches and bridges.

Both operates at Data Link Layer

A NETWORK BRIDGE	A NETWORK SWITCH
Packet forwarding in Bridges is performed using the software. Thus bridges are software-based.	Packet forwarding in Switches are performed using ASICS (Application Specific Integrated Circuits). Thus a switch is hardware-based.
Method of switching of a Bridge is store and forward.	Method of switching of a Switch can be store and forward, cut-through, or fragment-free.
A Bridge has only 2 ports.	A switch can handle many ports.
A Bridge is rarely used.	A Switch is frequently used.
A Bridge is a device that connects two LANs and controls data flow between them.	A Switch is a networking device that learns which machine is connected to its port by using the device's IP Address.
Bridges divide collision domain into two parts. Bridges can create collision domains but not broadcast domains.	Switches are used to connect the work stations or computer systems. If there are 20 workstations connected to a switch then there will be separate collision domain for each of the nodes.
	https://ipwithease.com

7. List and explain various modes of communication
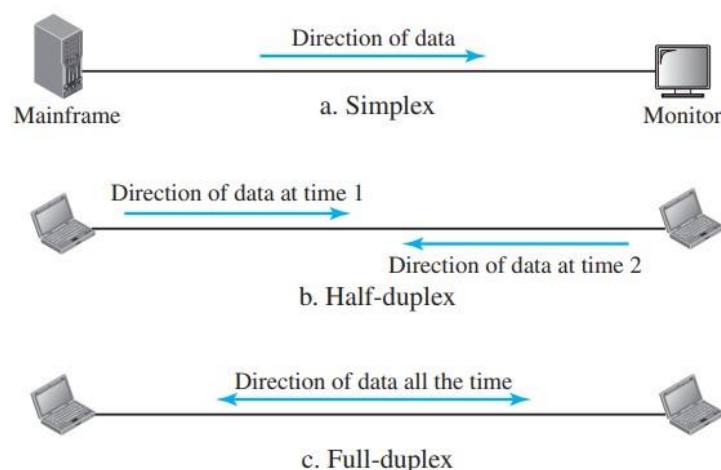
Comparison Chart

Basis for Comparison	Simplex	Half Duplex	Full Duplex
Direction of Communication	Unidirectional	Two-directional, one at a time	Two-directional, simultaneously
Send / Receive	Sender can only send data	Sender can send and receive data, but one a time	Sender can send and receive data simultaneously
Performance	Worst performing mode of transmission	Better than Simplex	Best performing mode of transmission
Example	Keyboard and monitor	Walkie-talkie	Telephone

8. Compare and contrast various network topologies

https://www.javatpoint.com/computer-network-topologies

9. For the bit stream 1100110, sketch the waveforms for each of the following codes: (a) NRZ-L. Assume, the signal level of preceding bit is positive voltage. (b) Manchester. (c) Differential Manchester - Assume, the signal level of preceding bit is negative voltage.
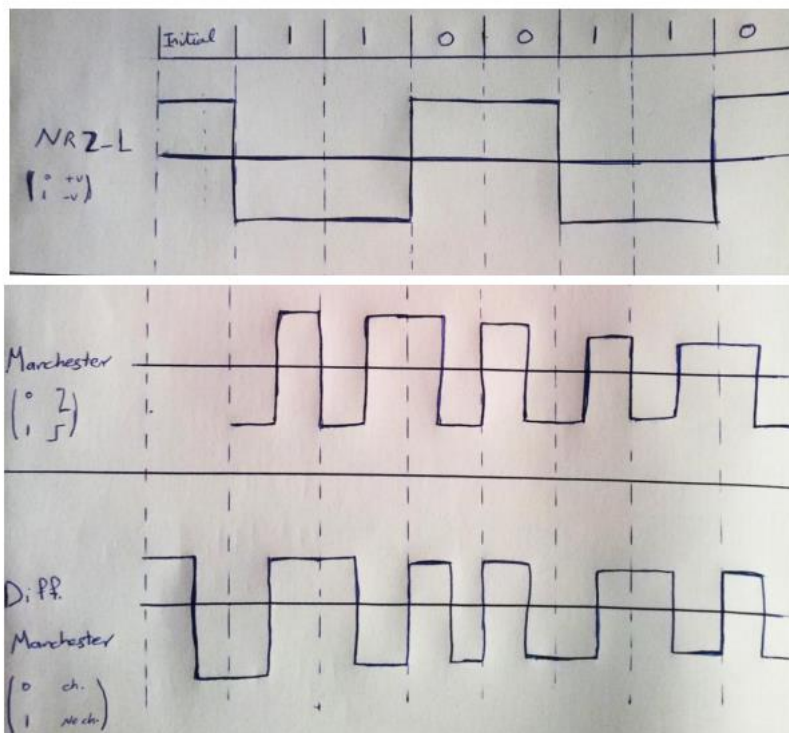
10. What are different guided transmission media?

<refer page 192 of text book – Data Communication by Behrouz A Forouzan – Uploaded to drive>

11. Compare various unguided transmission media.

Radio	Micro	Infrared
– 3KHz to 1 GHz	→ 1 GHz to 300 GHz	→ 300 GHz to 400 THz
– Omnidirectional	→ Unidirectional	
– Sending & receiving antennas do not need to be aligned	→ antennas need to be aligned	
– Susceptible to Interferences by other antenna	→ without interference	
→ sky mode	→ line-of-sight	
→ long distance	→ short distance (repeaters used to long-dis)	→ short-range comm
→ AM & FM Radio	– Cellular phones, satellite n/w	→ Remote control
→ Penetrate walls – so can be used inside building & can't isolate comm to inside or outside	→ can't penetrate walls. can't receive inside building	→ can't penetrate wall can't use outside