

INTRODUCTION TO COMPUTER NETWORKS:**1. What is a Computer Network?**

A collection of autonomous computers interconnected by a single technology
Two computers are said to be interconnected if they are able to exchange information.
Ex: Internet

2. Difference between Computer Network and Distributed System

A collection of independent computers appears to its users as a single coherent system.
Ex: World Wide Web, Software
A collection of autonomous computers interconnected by a single technology
Two computers are said to be interconnected if they are able to exchange information.
Ex: Internet, Hardware

3. What are the Uses of Computer Network?

1. Business Applications
2. Home Applications
3. Mobile Users
4. Social Issues

4. What is VPN

Networks called VPNs (Virtual Private Networks) may be used to join the individual networks at different sites into one extended network.

5. Define the Server and Client

Servers are centrally housed and maintained by a system administrator and Clients access remote data,

6. Explain the VoIP

Telephone calls between employees may be carried by the computer network instead of by the phone company. This technology is called IP telephony or Voice over IP (VoIP) when Internet technology is used.

7. Explain some forms of e-commerce applications

Tag	FullName	Example
B2C	Business to Consumer	Ordering Book Online
B2B	Business to Business	Car manufacturer ordering tires from supplier
G2C	Government to Consumer	Government distributing tax forms electronically
C2C	Consumer to Consumer	Auctioning second-hand products online
P2P	Peer to Peer	Music sharing

Network Hardware

8. How many types of Transmission Technologies

There are two types of transmission technology that are in widespread use: **broadcast links and point-to-point links**

9. Define point to point links and broadcast links

Point-to-point transmission with exactly one sender and exactly one receiver is sometimes called uni casting and In contrast, on a broadcast network, the communication channel is shared by all the machines on the network

10. Classification of interconnected processor by scale

Inter processor distance	Processor located in same	Example
1m	Square meter	Personal Area Network
10m	Room	Local Area Network
100m	Building	Local Area Network
1km	Campus	Local Area Network
10km	City	Metropolitan Area Network
100km	Country	Wide Area Network
1000 km	Continent	Wide Area Network
10000km	Planet	Wide Area Network

11. Define PAN with Example

PANs (Personal Area Networks) let devices communicate over the range of a person. Ex: The system unit (the PC) is normally the master, talking to the mouse, keyboard, etc., as slaves.

12. Define LAN with Example

LAN (Local Area Network). A LAN is a privately owned network that operates within and nearby a single building like a home, office or factory.

13. Define WiFi

There is a standard for wireless LANs called IEEE 802.11, popularly known as WiFi(Wireless Fidelity)

14. Define MAN with Example

A MAN (Metropolitan Area Network) covers a city. The best-known examples of MANs are the cable television networks available in many cities.

15. Define WAN with Example

A WAN (Wide Area Network) spans a large geographical area, often a country or continent

16. Distinguish between Connection oriented and Connection less Services

Service	Example	Type
Reliable message stream	Sequence of pages	Connectionoriented
Reliable byte stream	Movie download	Connectionoriented
Unreliable connection	Voice over IP	Connectionoriented
Unreliable datagram	Electronic junk mail	Connectionless
Acknowledged datagram	Text messaging	Connectionless
Request-reply	Database query	Connectionless

Reference Model**17. List out Reference Models**

TCP/IP reference model (Transmission Control Protocol/Internet Protocol)

OSI reference model (Open System Interconnection)

18. Summarize the OSI Layer

1. A layer should be created where a different abstraction is needed.
2. Each layer should perform a well-defined function.
3. The function of each layer should be chosen with an eye toward defining internationally standardized protocols
4. The layer boundaries should be chosen to minimize the information flow across the interfaces.
5. The number of layers should be large enough that distinct functions need not be thrown together in the same layer out of necessity and small enough that the architecture does not become unwieldy.

19. Write short notes on Physical Layer

- The physical layer is concerned with transmitting raw bits over a communication channel.
- The design issues have to do with making sure that when one side sends a 1 bit it is received by the other side as a 1 bit, not as a 0 bit.
- Design issues
 - what electrical signals should be used to represent a 1 and a 0,
 - how many nanoseconds a bit lasts,
 - whether transmission may proceed simultaneously in both directions,
 - how the initial connection is established,
 - how it is torn down when both sides are finished,
 - how many pins the network connector has, and
 - what each pin is used for.

- These design issues largely deal with mechanical, electrical, and timing interfaces, as well as the physical transmission medium, which lies below the physical layer.

20. Write Short notes on Data Link Layer

- ❖ The main task of the data link layer is to transform a raw transmission facility into a line that appears free of undetected transmission errors.
- ❖ It does so by masking the real errors so the network layer does not see them.
- ❖ It accomplishes this task by having the sender break up the input data into data frames (typically a few hundred or a few thousand bytes) and transmit the frames sequentially.

21. Design issues of Data Link Layer

- ❖ If the service is reliable, the receiver confirms correct receipt of each frame by sending back an acknowledgement frame.
- ❖ Another issue that arises in the data link layer is how to keep a fast transmitter from drowning a slow receiver in data.
- ❖ Some traffic regulation mechanism may be needed to let the transmitter know when the receiver can accept more data.
- ❖ Broadcast networks have an additional issue in the data link layer: how to control access to the shared channel.

22. How to resolve design issues in Data Link Layer

A special sub layer of the data link layer, the medium access control sublayer, deals with this problem.

23. What is a Subnet

The job of the subnet is to carry messages from host to host, just as the telephone system carries words (really just sounds) from speaker to listener.

24. What does Network Layer controls

The network layer controls the operation of the subnet.

25. Write Short notes on Network Layer

- The network layer controls the operation of the subnet.
- More generally, the quality of service provided (delay, transit time) is also a network layer issue.
- When a packet has to travel from one network to another to get to its destination, many problems can arise.
- The addressing used by the second network may be different from that used by the first one.
- The second one may not accept the packet at all because it is too large. The protocols may differ, and so on.
- It is up to the network layer to overcome all these problems to allow heterogeneous networks to be interconnected.
- In broadcast networks, the routing problem is simple, so the network layer is often thin or even nonexistent.

26. Write short notes on Transport Layer

The basic function of the transport layer is to accept data from above it, split it up into smaller units if need be, pass these to the network layer, and ensure that the pieces all arrive correctly at the other end.

27. Write short notes on Session Layer

- The session layer allows users on different machines to establish sessions between them.
- Sessions offer various services
 - **dialog control** (keeping track of whose turn it is to transmit),
 - **token management** (preventing two parties from attempting the same critical operation simultaneously),
 - **synchronization** (check pointing long transmissions to allow them to pick up from where they left off in the event of a crash and subsequent recovery)

28. Write short notes on Presentation Layer

- The Presentation Layer Unlike the lower layers, which are mostly concerned with moving bits around
- The presentation layer is concerned with the syntax and semantics of the information transmitted.
- In order to make it possible for computers with different internal data representations to communicate, the data structures to be exchanged can be defined in an abstract way, along with a standard encoding to be used “on the wire.”
- The presentation layer manages these abstract data structures and allows higher-level data structures (e.g., banking records) to be defined and exchanged.

29. Write short notes on Application Layer

- The application layer contains a variety of protocols that are commonly needed by users.
- One widely used application protocol is HTTP (HyperText Transfer Protocol), which is the basis for the World Wide Web.
- When a browser wants a Web page, it sends the name of the page it wants to the server hosting the page using HTTP.
- The server then sends the page back. Other application protocols are used for file transfer, electronic mail, and network news.

TCP/IP REFERENCE MODEL**30. Write short notes on TCP/IP**

- OSI is a reference model
- TCP/IP is a implementation of OSI
- It has 4 layers
- Application Layer, Transport Layer, Internet Layer, Host to Network Layer

31. Describe Link Layer in TCP/IP

- This is the combination of Data Link and Physical Layer
- It is used for physical transmission of data
- It defines a protocols to connect host
- It is also called as Host to Network Layer

32. Explain about Internetwork Layer in TCP/IP

- ❖ The functionalities of Internetwork Layer are
 - Packet Delivery
 - Routing
 - Congestion Control
- ❖ Main protocol is IP
- ❖ Responsible to transmit the packets independently
- ❖ Packets may not be received in order that have sent

33. What is transport Layer in TCP/IPs

- The functionalities are
 - Segmenting, splitting of data
 - Decides to send the data either in single path or multiple path /parallel path
- Break the data into small units which are handled efficiently by this layer
- Header information added
- Transmitting error free end to end delivery of segments

34. Write short notes on Application Layer in TCP/IP

- ❖ It is the combination of session and presentation Layer
- ❖ Interface between host and the service provided by transport layer
- ❖ Includes high level protocol
 - TELNET-Two way communication
 - FTP-Transmitting the file data
 - SMTP-Transport Electronic mail
 - DNS - Resolves IP address to textual information

35. Distinguish between OSI and TCP/IP

OSI LAYER	TCP/IP LAYER
Reference Model	Implementation of OSI
7 Layers	4 layers
Session & presentation layer are separately	Combines both session and presentation layer
Model is first(design), protocol is next	Protocol is first then Model
Protocol independent	Protocol dependent
Supports Connection less & connection oriented	Supports connection less

36. What is hub

- Hub is network device that is used to connect multiple computers in a network
- All the information send to the hub is automatically send to each port to every device
- A hub is less expensive, less intelligent, and less complicated
- Hub is generally used to connect computers in a LAN
- Transmission mode of hub is half duplex

37. What are the Advantages of hub

- The hub can broadcast the message
- It is less expensive due to that anyone can use it
- Easy installation
- Robust

38. What are the disadvantages of HUB

- If the HUB is failed the entire network will be failed
- We can't send private or personal data through HUB
- Hub doesn't provide any security
- Hub can't support full duplex transmission mode

39. What is a switch

- Switch is a network device that connects multiple computers together in the network
- It is mainly used to send the private messages as well as there is no wasting of data
- Switch can easily identifies that which device is connected with which port by using MAC address , that's why it is delivered message on particular destination machine
- Switch is more intelligent than HUB

40. What are the Advantages of Switch

- It is generally used to unicast the message
- It provides more security than HUB
- Switch supports full duplex data transmission
- It is used to send the data packet based on MAC address
- If a node fails there will be no effect in the entire network

41. What are the disadvantages of Switch

- If the switch is failed the entire network will be failed
- It is more expensive
- Difficult to setup

42. What is Router

- Router is a network device which works as a traffic controller.
- A main work of router is to choose a congestion free path through which the data packets will travel.
- Router receive data packets to the sender, analyze and forward those data packets then giving to receiver
- Router uses both LAN and WAN network

43. What are the advantages of Router

- It provides connection between two dissimilar type of networks
- Transmission rate is very high
- It internally uses some algorithm to find out congestion free path
- It provides both wire and wireless facility

44. What are the disadvantages of Router

- Router is more expensive compare to other network devices
- Routers are complex to maintain
- Security issues
- It only works with routable protocols.

45. What is Repeater

- Repeater is a network device through which we can “boost up the weak signals”
- When the signal travels in the network, after travelling some distance the intensity of the signal becomes low
- In order to regenerate the weak signal, we should use repeater device.
- It is used in wired and wireless

46. What are the advantages of Repeater

- It is used to regenerate the weak signal
- It is cheaper than other network devices
- Repeaters has the ability to extend the length of signal
- Increase/maintain the signal performance

47. What are the disadvantages of Repeater

- ❖ It requires number of repeaters after some distance
- ❖ Repeaters also unable to connect dissimilar type of network
- ❖ They can't reduce network traffic

48. Define Bridge

- Bridge is a network device that is used to separate LAN into number of sections
- It operates both physical as well as data link layer in OSI Model

49. What are the advantages of Bridge

- By using bridge device we can extend network
- It broadcast the data to each node like HUB & Repeater
- Collision can be reduced easily
- It is more intelligent

50. What are the disadvantages of Bridge

- ❖ It doesn't have stable connection between two different network
- ❖ Once it broadcast the message then it is incapable to stop the message
- ❖ It is more expensive
- ❖ The transmission rate of data is slower than repeater

51. Difference between TCP and UDP

TCP(Transmission Control Protocol)	UDP(User Datagram Protocol)
TCP is connection oriented protocol	UDP is connection less protocol
It is reliable	It is not reliable
It is slower than UDP	It is faster than TCP
The header size of TCP is 20 bytes	The header size of UDP is 8 bytes
Retransmission of lost packets is possible	Retransmission of lost packets is not possible
It used in HTTP,SMTP,FTP etc.,	It is used in video conferencing ,DNS etc

52. What is Gateway(1M)**53. What are the advantages & of Gateway(5M)****54. What is NIC and how many types of NIC's are available(1M)****55. Write short notes on MODEM(5M)****56. Explain Topology and how many types of topologies are available in computer network?(10M)****57. What is transmission modes and types explain with neat diagrams(5M)****58. What is data communication and what are the components of communication(10M)****59. What is the difference between IPv4 and IPv6(5M)****60. Difference between guided transmission media and unguided transmission media(5M)**

GUIDED TRANSMISSION MEDIA	UNGUIDED TRANSMISSION MEDIA
Guided media uses a Physical path or conductor to transmit the signals	Unguided media broadcast the signal through the air
It provides direction to signal for travelling	It does not provide any direction
Signal transmission speed is generally faster	Signal transmission speed is generally slower
Ex: Twisted Pairs, coaxial cables etc	Ex: Radio wave, micro wave