1. Define Network?
A network is a set of devices connected by physical media links. A network is recursively is a connection of two or more nodes by a physical link or two or more networks connected by one or more nodes.

2. What is Protocol?
A protocol is a set of rules that govern all aspects of information communication.

3. What is a Link?
At the lowest level, a network can consist of two or more computers directly connected by some physical medium such as coaxial cable or optical fiber. Such a physical medium is called as Link.

4. What is a node?
A network can consist of two or more computers directly connected by some physical medium such as coaxial cable or optical fiber. Such a physical medium is called as Links and the computer it connects is called as Nodes.

5. What is a gateway or Router?
A node that is connected to two or more networks is commonly called as router or Gateway. It generally forwards message from one network to another.

6. Name the factors that affect the performance of the network?
a.Number of Users
b. Type of transmission medium
c. Hardware
d. Software

7. What is Round Trip Time?
The duration of time it takes to send a message from one end of a network to the other and back, is called RTT.

8. List the layers of OSI
a. Physical Layer
b. Data Link Layer
c. Network Layer
d. Transport Layer
e. Session Layer
f. Presentation Layer
g. Application Layer

9. Which layers are network support layers?
a. Physical Layer
b. Data link Layer and
c. Network Layers

10. Which layers are user support layers?
a. Session Layer
b. Presentation Layer and
c. Application Layer

11. What is Pipelining ?
In networking and in other areas, a task is often begun before the previous task has ended. This is known as pipelining.

12. What is Piggy Backing?
A technique called piggybacking is used to improve the efficiency of the bidirectional protocols. When a frame is carrying data from A to B, it can also carry control information about arrived

(or lost) frames from B; when a frame is carrying data from B to A, it can also carry control information about the arrived (or lost) frames from A.

13. What are the two types of transmission technology available?
(i) Broadcast and (ii) point-to-point

14. What is Bandwidth?
Every line has an upper limit and a lower limit on the frequency of signals it can carry. This limited range is called the bandwidth.

15. Explain RIP (Routing Information Protocol)
It is a simple protocol used to exchange information between the routers.

16. What is subnet?
A generic term for section of a large networks usually separated by a bridge or router.

17. What is MAC address?
The address for a device as it is identified at the Media Access Control (MAC) layer in the network architecture. MAC address is usually stored in ROM on the network adapter card and is unique.

18. What is multiplexing?
Multiplexing is the process of dividing a link, the phycal medium, into logical channels for better efficiency. Here medium is not changed but it has several channels instead of one.

19. What is simplex?
It is the mode of communication between two devices in which flow of data is unidirectional. i.e. one can transmit and other can receive.
E.g. keyboard and monitor.

20. What is half-duplex?
It is the mode of communication between two devices in which flow of data is bi-directional but not at the same time. ie each station can transmit and receive but not at the same time.
E.g walkie-talkies are half-duplex system.

21.What is full duplex?
It is the mode of communication between two devices in which flow of data is bi-directional and it occurs simultaneously. Here signals going in either direction share the capacity of the link.
E.g. telephone

22. What is sampling?
It is the process of obtaining amplitude of a signal at regular intervals.

23. What is Asynchronous mode of data transmission?
It is a serial mode of transmission.
In this mode of transmission, each byte is framed with a start bit and a stop bit. There may be a variable length gap between each byte.

24. What is Synchronous mode of data transmission?
It is a serial mode of transmission.In this mode of transmission, bits are sent in a continuous stream without start and stop bit and without gaps between bytes. Regrouping the bits into meaningful bytes is the responsibility of the receiver.

25. What are the different types of multiplexing?
Multiplexing is of three types. Frequency division multiplexing and wave division multiplexing is for analog signals and time division multiplexing is for digital signals.

26. What are the different transmission media?
The transmission media is broadly categorized into two types
i)Guided media(wired)
i)Unguided media(wireless)

27. What are the duties of data link layer?
Data link layer is responsible for carrying packets from one hop (computer or router) to the next. The duties of data link layer include packetizing, adderssing, error control, flow control, medium access control.

28. .What are the types of errors?
Errors can be categorized as a single-bit error or burst error. A single bit error has one bit error per data unit. A burst error has two or more bits errors per data unit.

29. What do you mean by redundancy?
Redundancy is the concept of sending extra bits for use in error detection. Three common redundancy methods are parity check, cyclic redundancy check (CRC), and checksum.

30. Define parity check.
In parity check, a parity bit is added to every data unit so that the total number of 1s is even (or odd for odd parity).Simple parity check can detect all single bit errors. It can detect burst errors only if the total number of errors in each data unit is odd.In two dimensional parity checks, a block of bits is divided into rows and a redundant row of bits is added to the whole block.

31. Define cyclic redundancy check (CRC).
C RC appends a sequence of redundant bits derived from binary division to the data unit. The divisor in the CRC generator is often represented as an algebraic polynomial.

32. What is hamming code?
The hamming code is an error correction method using redundant bits. The number of bits is a function of the length of the data bits. In hamming code for a data unit of m bits, we use the formula 2r >= m+r+1 to determine the number of redundant bits needed. By rearranging the order of bit transmission of the data units, the hamming code can correct burst errors.

33.Define stop and wait ARQ.
In stop and wait ARQ, the sender sends a frame and waits for an acknowledgement from the receiver before sending the next frame.

34. What do you mean by network control protocol?
Network control protocol is a set of protocols to allow the encapsulation of data coming from network layer protocol that requires the services of PPP

35. What do you mean by CSMA?
To reduce the possibility of collision CSMA method was developed. In CSMA each station first listen to the medium (Or check the state of the medium) before sending. It can't eliminate collision.

36. What do you mean by Bluetooth?
It is a wireless LAN technology designed to connect devices of different functions such as telephones, notebooks, computers, cameras, printers and so on.

37. What is IP address?
The internet address (IP address) is 32bits that uniquely and universally defines a host or router on the internet.The portion of the IP address that identifies the network is called netid. The portion of the IP address that identifies the host or router on the network is called hostid.

38. What do you mean by ALOHA ?
It is the method used to solve the channel allocation problem .It is used for:
i)ground based radio broadcasting
ii)In a network in which uncoordinated users are competing for the use of single channel.
It is of two types:
1.Pure aloha
2.Slotted aloha

39. What is Firewalls?
It is an electronic downbridge which is used to enhance the security of a network. It's configuration has two components.
i)Two routers
ii)Application gateway
the packets traveling through the LAN are inspected here and packets meeting certain criteria are forwarded and others are dropped.

40. What is Repeaters ?
A receiver receives a signal before it becomes too weak or corrupted,regenerates the original bit pattern,and puts the refreshed copy back onto the link.It operates on phycal layer of OSI model.

41. What is Bridges?
They divide large network into smaller components.They can relay frames between two originally separated LANs.They provide security through partitioning traffic.They operate on physical and data link layer of OSI model.

42. What is ICMP?
ICMP is Internet Control Message Protocol, a network layer protocol of the TCP/IP suite used by hosts and gateways to send notification of datagram problems back to the sender. It uses the echo test / reply to test whether a destination is reachable and responding. It also handles both control and error messages.
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43. What is FDM?
FDM is an analog technique that can be applied when the bandwidth of a link is greater than the combined bandwidths of the signals to be transmitted.

44. What is WDM?
WDM is conceptually the same as FDM, except that the multiplexing and demultiplexing involve light signals transmitted through fiber optics channel.

45. What is TDM?
TDM is a digital process that can be applied when the data rate capacity of the transmission medium is greater than the data rate required by the sending and receiving devices.

46. List the steps involved in creating the checksum.
a. Divide the data into sections
b. Add the sections together using 1's complement arithmetic
c. Take the complement of the final sum, this is the checksum.

47. Compare Error Detection and Error Correction:
The correction of errors is more difficult than the detection. In error detection, checks only any error has occurred. In error correction, the exact number of bits that are corrupted and location in the message are known. The number of the errors and the size of the message are important factors.

48. What are the protocols in application layer ?
The protocols defined in application layer are
• TELNET
• FTP
• SMTP
• DNS

49. What are the protocols in transport layer ?
The protocols defined in transport layer are
• TCP
• UDP

50. What do you mean by client server model ?
In client server model ,the client runs a program to request a service and the server runs a program to provide the service.These two programs communicate with each other. One server program can provide services to many client programs.

51. What is TELNET ?
TELNET is a client –server application that allows a user to log on to a remote machine,giving the user access to the remote system. TELNET is an abbreviation of terminal Network.

52. What is Hypertext Transfer Protocol(HTTP) ?
It is the main protocol used to access data on the World Wide Web .the protol transfers data in the form of plain text,hypertext,audio,video,and so on. It is so called because its efficiency allows its use in a hypertext environment where there are rapid jumps from one document to another.

53. What is World Wide Web ?
Ans: World Wide Web is a repository of information spread all over the world and linked together.It is a unique combination of flexibility,portability,and user-friendly features .The World Wide Web today is a distributed client-server service,in which a client using a browser can access a service using a server.The service provided is distributed over many locations called web sites.

54. What is Beaconing?
The process that allows a network to self-repair networks problems. The stations on the network notify the other stations on the ring when they are not receiving the transmissions. Beaconing is used in Token ring and FDDI networks.

55. What is RAID?
A method for providing fault tolerance by using multiple hard disk drives.

56. What is NETBIOS and NETBEUI?
NETBIOS is a programming interface that allows I/O requests to be sent to and received from a remote computer and it hides the networking hardware from applications.
NETBEUI is NetBIOS extended user interface. A transport protocol designed by microsoft and IBM for the use on small subnets.

57. What is difference between ARP and RARP?
The address resolution protocol (ARP) is used to associate the 32 bit IP address with the 48 bit physical address, used by a host or a router to find the physical address of another host on its network by sending a ARP query packet that includes the IP address of the receiver.
The reverse address resolution protocol (RARP) allows a host to discover its Internet address when it knows only its physical address.

58. What is the minimum and maximum length of the header in the TCP segment and IP datagram?

The header should have a minimum length of 20 bytes and can have a maximum length of 60 bytes.

59. What are major types of networks and explain?
Server-based network: provide centralized control of network resources and rely on server computers to provide security and network administration
Peer-to-peer network: computers can act as both servers sharing resources and as clients using the resources.

60. What are the important topologies for networks?
BUS topology: In this each computer is directly connected to primary network cable in a single line.
Advantages: Inexpensive, easy to install, simple to understand, easy to extend.

STAR topology: In this all computers are connected using a central hub.
Advantages: Can be inexpensive, easy to install and reconfigure and easy to trouble shoot physical problems.

RING topology: In this all computers are connected in loop.
Advantages: All computers have equal access to network media, installation can be simple, and signal does not degrade as much as in other topologies because each computer regenerates it.

61. What is mesh network?
A network in which there are multiple network links between computers to provide multiple paths for data to travel.

62. What is difference between baseband and broadband transmission?
In a baseband transmission, the entire bandwidth of the cable is consumed by a single signal. In broadband transmission, signals are sent on multiple frequencies, allowing multiple signals to be sent simultaneously.

63. What is packet filter?
Packet filter is a standard router equipped with some extra functionality. The extra functionality allows every incoming or outgoing packet to be inspected. Packets meeting some criterion are forwarded normally. Those that fail the test are dropped.

64. What is traffic shaping?
One of the main causes of congestion is that traffic is often busy. If hosts could be made to transmit at a uniform rate, congestion would be less common. Another open loop method to help manage congestion is forcing the packet to be transmitted at a more predictable rate. This is called traffic shaping.

65. What is multicast routing?
Sending a message to a group is called multicasting, and its routing algorithm is called multicast routing.

66. What is Kerberos?
It is an authentication service developed at the Massachusetts Institute of Technology. Kerberos uses encryption to prevent intruders from discovering passwords and gaining unauthorized access to files.

67. What is passive topology?
When the computers on the network simply listen and receive the signal, they are referred to as passive because they don't amplify the signal in any way. Example for passive topology - linear bus.

68. What are the advantages of Distributed Processing?
a. Security/Encapsulation
b. Distributed database

c. Faster Problem solving
d. Security through redundancy
e. Collaborative Processing

69. Name the factors that affect the reliability of the network?
a. Frequency of failure
b. Recovery time of a network after a failure

70. When a switch is said to be congested?
It is possible that a switch receives packets faster than the shared link can accommodate and stores in its memory, for an extended period of time, then the switch will eventually run out of buffer space, and some packets will have to be dropped and in this state is said to congested state.