Q1. What are 10Base2, 10Base5 and 10BaseT Ethernet LANs?

Ans. 10Base2—An Ethernet term meaning a maximum transfer rate of 10 Megabits per second that uses baseband signaling, with a contiguous cable segment length of 100 meters and a maximum of 2 segments.
10Base5—An Ethernet term meaning a maximum transfer rate of 10 Megabits per second that uses baseband signaling, with 5 continuous segments not exceeding 100 meters per segment.
10BaseT—An Ethernet term meaning a maximum transfer rate of 10 Megabits per second that uses baseband signaling and twisted pair cabling.

Q2. What is the difference between an unspecified passive open and a fully specified passive open?

Ans. An unspecified passive open has the server waiting for a connection request from a client. A fully specified passive open has the server waiting for a connection from a specific client.

Q3. Explain the function of Transmission Control Block.

Ans. A TCB is a complex data structure that contains a considerable amount of information about each connection.

Q4. What is a Management Information Base (MIB)?

Ans. A Management Information Base is part of every SNMP-managed device. Each SNMP agent has the MIB database that contains information about the device's status, its performance, connections, and configuration. The MIB is queried by SNMP.

Q5. What is anonymous FTP and why would you use it?

Ans. Anonymous FTP enables users to connect to a host without using a valid login and password. Usually, anonymous FTP uses a login called anonymous or guest, with the password usually requesting the user's ID for tracking purposes only. Anonymous FTP is used to enable a large number of users to access files on the host without having to go to the trouble of setting up logins for them all. Anonymous FTP systems usually have strict controls over the areas an anonymous user can access.

Q6. What is a pseudo tty?

Ans. A pseudo tty or false terminal enables external machines to connect through Telnet or rlogin. Without a pseudo tty, no connection can take place.

Q7. Which layer of the 7 layer model provides services to the Application layer over the Session layer connection?

Ans. Presentation.

Q8. What does the Mount protocol do ?

Ans. The Mount protocol returns a file handle and the name of the file system in which a requested file resides. The message is sent to the client from the server after reception of a client's request.

Q9. What is External Data Representation?

Ans. External Data Representation is a method of encoding data within an RPC message, used to ensure that the data is not system-dependent.

Q10. Which OSI Reference Layer controls application to application communication?

Ans. Session

Q11. BOOTP helps a diskless workstation boot. How does it get a message to the network looking for its IP address and the location of its operating system boot files?

Ans. BOOTP sends a UDP message with a subnetwork broadcast address and waits for a reply from a server that gives it the IP address. The same message might contain the name of the machine that has the boot files on it. If the boot image location is not specified, the workstation sends another UDP message to query the server.

Q12. What is a DNS resource record?

Ans. A resource record is an entry in a name server's database. There are several types of resource records used, including name-to-address resolution information. Resource records are maintained as ASCII files.

Q13. What protocol is used by DNS name servers?

Ans. DNS uses UDP for communication between servers. It is a better choice than TCP because of the improved speed a connectionless protocol offers. Of course, transmission reliability suffers with UDP.

Q14. What is the difference between interior and exterior neighbor gateways?

Ans. Interior gateways connect LANs of one organization, whereas exterior gateways connect the organization to the outside world.

Q15. What is the HELLO protocol used for?

Ans. The HELLO protocol uses time instead of distance to determine optimal routing. It is an alternative to the Routing Information Protocol.

Q16. What are the advantages and disadvantages of the three types of routing tables?

Ans. The three types of routing tables are fixed, dynamic, and fixed central. The fixed table must be manually modified every time there is a change. A dynamic table changes its information based on network traffic, reducing the amount of manual maintenance. A fixed central table lets a manager modify only one table, which is then read by other devices. The fixed central table reduces the need to update each machine's table, as with the fixed table. Usually a dynamic table causes the fewest problems for a network administrator, although the table's contents can change without the administrator being aware of the change.

Q17. What is a characteristic of Store and Forward switches?

Ans. They read the entire frame and check CRC before forwarding.

Q18. What is source route?

Ans. It is a sequence of IP addresses identifying the route a datagram must follow. A source route may optionally be included in an IP datagram header.

Q19. What is RIP (Routing Information Protocol)?

Ans. It is a simple protocol used to exchange information between the routers.

Q20. What is SLIP (Serial Line Interface Protocol)?

Ans. It is a very simple protocol used for transmission of IP datagrams across a serial line.

Q21. What is Proxy ARP?

Ans. It is using a router to answer ARP requests. This will be done when the originating host believes that a destination is local, when in fact is lies beyond router.

Q22. What is OSPF?

Ans. It is an Internet routing protocol that scales well, can route traffic along multiple paths, and uses knowledge of an Internet's topology to make accurate routing decisions.

Q23. What is Kerberos?

Ans. 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.

Q24. What is a Multi-homed Host?

Ans. It is a host that has a multiple network interfaces and that requires multiple IP addresses is called as a Multi-homed Host.

Q25. What is NVT (Network Virtual Terminal)?

Ans. It is a set of rules defining a very simple virtual terminal interaction. The NVT is used in the start of a Telnet session.

Q26. What is Gateway-to-Gateway protocol?

Ans. It is a protocol formerly
used to exchange routing information between Internet core routers.

Q27. What is BGP (Border Gateway Protocol)?

Ans. It is a protocol used to advertise the set of networks that can be reached with in an autonomous system. BGP enables this information to be shared with the autonomous system. This is newer than EGP (Exterior Gateway Protocol).

Q28. What is autonomous system?

Ans. It is a collection of routers under the control of a single administrative authority and that uses a common Interior Gateway Protocol.

Q29. What is EGP (Exterior Gateway Protocol)?

Ans. It is the protocol the routers in neighboring autonomous systems use to identify the set of networks that can be reached within or via each autonomous system.

Q30. What is IGP (Interior Gateway Protocol)?

Ans. It is any routing protocol used within an autonomous system.

Q31. What is Mail Gateway?

Ans. It is a system that performs a protocol translation between different electronic mail delivery protocols.

Q32. What is wide-mouth frog?

Ans. Wide-mouth frog is the simplest known key distribution center (KDC) authentication protocol.

Q33. What are Digrams and Trigrams?

Ans. The most common two letter combinations are called as digrams. e.g. th, in, er, re and an. The most common three letter combinations are called as trigrams. e.g. the, ing, and, and ion.

Q34. What is silly window syndrome?

Ans. It is a problem that can ruin TCP performance. This problem occurs when data are passed to the sending TCP entity in large blocks, but an interactive application on the receiving side reads 1 byte at a time.

Q35. What is region?

Ans. When hierarchical routing is used, the routers are divided into what we call regions, with each router knowing all the details about how to route packets to destinations within its own region, but knowing nothing about the internal structure of other regions.

Q36. What is multicast routing?

Ans. Sending a message to a group is called multicasting, and its routing algorithm is called multicast routing.

Q37. What is traffic shaping?

Ans. 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.

Q38. What is packet filter?

Ans. 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.

Q39. What is virtual path?

Ans. Along any transmission path from a given source to a given destination, a group of virtual circuits can be grouped together into what is called path.

Q40. What is virtual channel?

Ans. Virtual channel is normally a connection from one source to one destination, although multicast connections are also permitted. The other name for virtual channel is virtual circuit.

Q41. What is logical link control?

Ans. One of two sublayers of the data link layer of OSI reference model, as defined by the IEEE 802 standard. This sublayer is responsible for maintaining the link between computers when they are sending data across the physical network connection.

Q42. Why should you care about the OSI Reference Model?

Ans. It provides a framework for discussing network operations and design.

Q43. What is the difference between routable and non- routable protocols?

Ans. Routable protocols can work with a router and can be used to build large networks. Non-Routable protocols are designed to work on small, local networks and cannot be used with a router.

Q44. What is MAU?

Ans. In token Ring , hub is called Multistation Access Unit(MAU).

Q45. Explain 5-4-3 rule?

Ans. In a Ethernet network, between any two points on the network, there can be no more than five network segments or four repeaters, and of those five segments only three of segments can be populated.

Q46. What is the difference between TFTP and FTP application layer protocols?

Ans. The Trivial File Transfer Protocol (TFTP) allows a local host to obtain files from a remote host but does not provide reliability or security. It uses the fundamental packet delivery services offered by UDP. The File Transfer Protocol (FTP) is the standard mechanism provided by TCP / IP for copying a file from one host to another. It uses the services offered by TCP and so is reliable and secure. It establishes two connections (virtual circuits) between the hosts, one for data transfer and another for control information.

Q47. What is the range of addresses in the classes of internet addresses?

Ans. Class A 0.0.0.0 – 127.255.255.255

Class B 128.0.0.0 – 191.255.255.255

Class C 192.0.0.0 – 223.255.255.255

Class D 224.0.0.0 – 239.255.255.255

Class E 240.0.0.0 – 247.255.255.255

Q48. What is the minimum and maximum length of the header in the TCP segment and IP datagram?

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

Q49. What is difference between ARP and RARP?

Ans. 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.

Q50. What is ICMP?

Ans. 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.

Q51. What are the data units at different layers of the TCP / IP protocol suite?

Ans. The data unit created at the application layer is called a message, at the transport layer the data unit created is called either a segment or an user datagram, at the network layer the data unit created is called the datagram, at the data link layer the datagram is encapsulated in to a frame and finally transmitted as signals along the transmission media.

Q52. What is Project 802?

Ans. It is a project started by IEEE to set standards that enable intercommunication between equipment from a variety of manufacturers. It is a way for specifying functions of the physical layer, the data link layer and to some extent the network layer to allow for interconnectivity of major LAN protocols.
It consists of the following:

- 802.1 is an internetworking standard for compatibility of different LANs and MANs across protocols.
- 802.2 Logical link control (LLC) is the upper sublayer of the data link layer which is non-architecture-specific, that is remains the same for all IEEE-defined LANs.
- Media access control (MAC) is the lower sublayer of the data link layer that contains some distinct modules each carrying proprietary information specific to the LAN product being used. The modules are Ethernet LAN (802.3), Token ring LAN (802.4), Token bus LAN (802.5).
- 802.6 is distributed queue dual bus (DQDB) designed to be used in MANs.

Q53. What is Bandwidth?

Ans. 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.

Q54. Difference between bit rate and baud rate.

Ans. Bit rate is the number of bits transmitted during one second whereas baud rate refers to the number of signal units per second that are required to represent those bits.
baud rate = bit rate / N where N is no-of-bits represented by each signal shift.

Q55. What is MAC address?

Ans. 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.

Q56. What is attenuation?

Ans. The degeneration of a signal over distance on a network cable is called attenuation.

Q57. What is cladding?

Ans. A layer of a glass surrounding the center fiber of glass inside a fiber-optic cable.

Q58. What is RAID?

Ans. A method for providing fault tolerance by using multiple hard disk drives.

Q59. What is NETBIOS and NETBEUI?

Ans. 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.

Q60. What is redirector?

Ans. Redirector is software that intercepts file or prints I/O requests and translates them into network requests. This comes under presentation layer.

Q61. What is Beaconing?

Ans. 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.

Q62. What is terminal emulation, in which layer it comes?

Ans. Telnet is also called as terminal emulation. It belongs to application layer.

Q63. What is frame relay, in which layer it comes?

Ans. Frame relay is a packet switching technology. It will operate in the data link layer.

Q64. What do you meant by "triple X" in Networks?

Ans. The function of PAD (Packet Assembler Disassembler) is described in a document known as X.3. The standard protocol has been defined between the terminal and the PAD, called X.28; another standard protocol exists between hte PAD and the network, called X.29. Together, these three recommendations are often called "triple X"

Q65. What is SAP?

Ans. Series of interface points that allow other computers to communicate with the other layers of network protocol stack.

Q66. What is subnet?

Ans. A generic term for section of a large networks usually separated by a bridge or router.

Q67. What is Brouter?

Ans. Hybrid devices that combine the features of both bridges and routers.

Q68. How Gateway is different from Routers?

Ans. A gateway operates at the upper levels of the OSI model and translates information between two completely different network architectures or data formats.

Q69. What are the different type of networking / internetworking devices?

Ans. Repeater:

Also called a regenerator, it is an electronic device that operates only at physical layer. It receives the signal in the network before it becomes weak, regenerates the original bit pattern and puts the refreshed copy back in to the link.

Bridges:

These operate both in the physical and data link layers of LANs of same type. They divide a larger network in to smaller segments. They contain logic that allow them to keep the traffic for each segment separate and thus are repeaters that relay a frame only the side of the segment containing the intended recipent and control congestion.

Routers:

They relay packets among multiple interconnected networks (i.e. LANs of different type). They operate in the physical, data link and network layers. They contain software that enable them to determine which of the several possible paths is the best for a particular transmission.

Gateways:

They relay packets among networks that have different protocols (e.g. between a LAN and a WAN). They accept a packet formatted for one protocol and convert it to a packet formatted for another protocol before forwarding it. They operate in all seven layers of the OSI model.

Q70. What is mesh network?

Ans. A network in which there are multiple network links between computers to provide multiple paths for data to travel.

Q71. What is passive topology?

Ans. 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.

Q72. What are the important topologies for networks?

Ans. 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.

Adva

ntages:

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.

Q73. What are major types of networks and explain

Server-based network

Peer-to-peer network.

Ans. Peer-to-peer network, computers can act as both servers sharing resources and as clients using the resources. Server-based networks provide centralized control of network resources and rely on server computers to provide security and network administration

Q74. What is Protocol Data Unit?

Ans. The data unit in the LLC level is called the protocol data unit (PDU). The PDU contains of four fields a destination service access point (DSAP), a source service access point (SSAP), a control field and an information field. DSAP, SSAP are addresses used by the LLC to identify the protocol stacks on the receiving and sending machines that are generating and using the data. The control field specifies whether the PDU frame is a information frame (I -frame) or a supervisory frame (S – frame) or a unnumbered frame (U – frame).

Q75. What is difference between baseband and broadband transmission?

Ans. 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.

Q76. What are the possible ways of data exchange?

Ans. (i) Simplex (ii) Half-duplex (iii) Full-duplex.

Q77. What are the types of Transmission media?

Ans. Signals are usually transmitted over some transmission media that are broadly classified in to two categories.

Guided Media:

These are those that provide a conduit from one device to another that include twisted-pair, coaxial cable and fiber-optic cable. A signal traveling along any of these media is directed and is contained by the physical limits of the medium. Twisted-pair and coaxial cable use metallic that accept and transport signals in the form of electrical current. Optical fiber is a glass or plastic cable that accepts and transports signals in the form of light.

Unguided Media:

This is the wireless media that transport electromagnetic waves without using a physical conductor. Signals are broadcast either through air. This is done through radio communication, satellite communication and cellular telephony.

Q78. Difference between the communication and transmission.

Ans. Transmission is a physical movement of information and concern issues like bit polarity, synchronization, clock etc.

Communication means the meaning full exchange of information between two communication media.

Q79.The Internet Control Message Protocol occurs at what layer of the seven layer model?

Ans. Network

Q80.Which protocol resolves an IP address to a MAC address?

Ans. ARP

Q81.MIDI and MPEG are examples of what layer of the OSI seven layer model?

Ans. Presentation

Q82.What is the protocol number for UDP?

Ans. 17

Q83.Which protocol is used for booting diskless workstations?

Ans. RARP

Q84.Which layer is responsible for putting 1s and 0s into a logical group?

Ans. Physical

Q85.What does 'P' mean when running a Trace?

Ans. Protocol unreachable

Q86.UDP works at which layer of the DOD model?

Ans. Host to Host

Q87.What is the default encapsulation of Netware 3.12?

Ans. 802.2

Q88.Ping uses which Internet layer protocol?

Ans. ICMP

Q89.Which switching technology can reduce the size of a broadcast domain?

Ans. VLAN

Q90.What is the first step in data encapsulation?

Ans. User information is converted into data.

Q91.What is the protocol number for TCP?

Ans. 6

Q92.What do you use the Aux port for?

Ans. Modem

Q93.Repeaters work at which layer of the OSI model?

Ans. Physical

Q94.WAN stands for which of the following?

Ans. Wide Area Network

Q95.What ISDN protocol specifies concepts, terminology, and services?

Ans. I

Q96.LAN stands for which of the following?

Ans. Local Are Network

Q97.DHCP stands for

Ans. Dynamic Host Configuration Protocol

Q98.What does the acronym ARP stand for?

Ans. Address Resolution Protocol

Q99.Which layer is responsible for identifying and establishing the availability of the intended communication partner?

Ans. Application.

Q100.Which OSI layer provides mechanical, electrical, procedural for activating, maintaining physical link?

Ans. Physical.

19. What is semantic gap?

Defining a useful channel involves both understanding the applications requirements and recognizing the limitations of the underlying technology. The gap between what applications expects and what the underlying technology can provide is called semantic gap.

20. 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.

21. Define the terms Unicasting, Multiccasting and Broadcasting?

If the message is sent from a source to a single destination node, it is called Unicasting.
If the message is sent to some subset of other nodes, it is called Multicasting.
If the message is sent to all the m nodes in the network it is called Broadcasting.

22. What is Multiplexing?

Multiplexing is the set of techniques that allows the simultaneous transmission of multiple signals across a single data link.

23. Name the categories of Multiplexing?

a. Frequency Division Multiplexing (FDM)
b. Time Division Multiplexing (TDM)
   i. Synchronous TDM
   ii. ASynchronous TDM Or Statistical TDM.
c. Wave Division Multiplexing (WDM)

24. 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.

25. What is WDM?

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

26. 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.

27. What is Synchronous TDM?

In STDM, the multiplexer allocates exactly the same time slot to each device at all times, whether or not a device has anything to transmit.

28. 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

29. Which layers are network support layers?

a. Physical Layer
b. Data link Layer and
c. Network Layers

30. Which layers are user support layers?

a. Session Layer
b. Presentation Layer and
c. Application Layer

31. Which layer links the network support layers and user support layers?

The Transport layer links the network support layers and user support layers.

32. What are the concerns of the Physical Layer?

Physical layer coordinates the functions required to transmit a bit stream over a physical medium.
a. Physical characteristics of interfaces and media
b. Representation of bits
c. Data rate
d. Synchronization of bits
e. Line configuration
f. Physical topology
g. Transmission mode

33. What are the responsibilities of Data Link Layer?

The Data Link Layer transforms the physical layer, a raw transmission facility, to a reliable link and is responsible for node-node delivery.
a. Framing
b. Physical Addressing
c. Flow Control
d. Error Control
e. Access Control

34. What are the responsibilities of Network Layer?

The Network Layer is responsible for the source-to-destination delivery of packet possibly across multiple networks (links).
a. Logical Addressing
b. Routing

35. What are the responsibilities of Transport Layer?

The Transport Layer is responsible for source-to-destination delivery of the entire message.
a. Service-point Addressing
b. Segmentation and reassembly
c. Connection Control
d. Flow Control
e. Error Control

36. What are the responsibilities of Session Layer?

The Session layer is the network dialog Controller. It establishes, maintains and synchronizes the interaction between the communicating systems.

a. Dialog control
b. Synchronization

37. What are the responsibilities of Presentation Layer?

The Presentation layer is concerned with the syntax and semantics of the information exchanged between two systems.
a. Translation
b. Encryption
c. Compression

38. What are the responsibilities of Application Layer?

The Application Layer enables the user, whether human or software, to access the network. It provides user interfaces and support for services such as e-mail, shared database management and other types of distributed information services.
a. Network virtual Terminal
b. File transfer, access and Management (FTAM)
c. Mail services
d. Directory Services

39. What are the two classes of hardware building blocks?

Nodes and Links.

40. What are the different link types used to build a computer network?

a. Cables
b. Leased Lines
c. Last-Mile Links
d. Wireless Links

41. What are the categories of Transmission media?

a. Guided Media
  i. Twisted - Pair cable
    1. Shielded TP
    2. Unshielded TP
  ii. Coaxial Cable
  iii. Fiber-optic cable
b. Unguided Media
  i. Terrestrial microwave
  ii. Satellite Communication

42. What are the types of errors?

a. Single-Bit error
  In a single-bit error, only one bit in the data unit has changed

b. Burst Error
A Burst error means that two or more bits in the data have changed.

43. What is Error Detection? What are its methods?

Data can be corrupted during transmission. For reliable communication errors must be deducted and Corrected. Error Detection uses the concept of redundancy, which means adding extra bits for detecting errors at the destination. The common Error Detection methods are
a. Vertical Redundancy Check (VRC)
b. Longitudinal Redundancy Check (VRC)
c. Cyclic Redundancy Check (VRC)
d. Checksum

44. What is Redundancy?

The concept of including extra information in the transmission solely for the purpose of comparison. This technique is called redundancy.

45. What is VRC?

It is the most common and least expensive mechanism for Error Detection. In VRC, a parity bit is added to every data unit so that the total number of 1s becomes even for even parity. It can detect all single-bit errors. It can detect burst errors only if the total number of errors in each data unit is odd.

46. What is LRC?

In LRC, a block of bits is divided into rows and a redundant row of bits is added to the whole block. It can detect burst errors. If two bits in one data unit are damaged and bits in exactly the same positions in another data unit are also damaged, the LRC checker will not detect an error. In LRC a redundant data unit follows n data units.

47. What is CRC?

CRC, is the most powerful of the redundancy checking techniques, is based on binary division.

48. What is Checksum?

Checksum is used by the higher layer protocols (TCP/IP) for error detection

49. 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.

50. What are the Data link protocols?

Data link protocols are sets of specifications used to implement the data link layer. The categories of Data Link protocols are 1. Asynchronous Protocols

2. Synchronous Protocols
   a. Character Oriented Protocols
   b. Bit Oriented protocols

51. 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.

52. What is Forward Error Correction?

Forward error correction is the process in which the receiver tries to guess the message by using redundant bits.

53. Define Retransmission?

Retransmission is a technique in which the receiver detects the occurrence of an error and asks the sender to resend the message. Resending is repeated until a message arrives that the receiver believes is error-freed.

54. What are Data Words?

In block coding, we divide our message into blocks, each of k bits, called datawords. The block coding process is one-to-one. The same dataword is always encoded as the same codeword.

55. What are Code Words?

"r" redundant bits are added to each block to make the length n = k + r. The resulting n-bit blocks are called codewords. $2^n - 2^k$ codewords that are not used. These codewords are invalid or illegal.

56. What is a Linear Block Code?

A linear block code is a code in which the exclusive OR (addition modulo-2) of two valid codewords creates another valid codeword.

57. What are Cyclic Codes?

Cyclic codes are special linear block codes with one extra property. In a cyclic code, if a codeword is cyclically shifted (rotated), the result is another codeword.

58. Define Encoder?

A device or program that uses predefined algorithms to encode, or compress audio or video data for storage or transmission use. A circuit that is used to convert between digital video and analog video.

59. Define Decoder?

A device or program that translates encoded data into its original format (e.g. it decodes the data). The term is often used in reference to MPEG-2 video and sound data, which must be decoded before it is output.

60. What is Framing?

Framing in the data link layer separates a message from one source to a destination, or from other messages to other destinations, by adding a sender address and a destination address. The destination address defines where the packet has to go and the sender address helps the recipient acknowledge the receipt.

61. What is Fixed Size Framing?

In fixed-size framing, there is no need for defining the boundaries of the frames. The size itself can be used as a delimiter.

62. Define Character Stuffing?

In byte stuffing (or character stuffing), a special byte is added to the data section of the frame when there is a character with the same pattern as the flag. The data section is stuffed with an extra byte. This byte is usually called the escape character (ESC), which has a predefined bit pattern. Whenever the receiver encounters the ESC character, it removes it from the data section and treats the next character as data, not a delimiting flag.

63. What is Bit Stuffing?

Bit stuffing is the process of adding one extra 0 whenever five consecutive Is follow a 0 in the data, so that the receiver does not mistake the pattern 0111110 for a flag.

64. What is Flow Control?

Flow control refers to a set of procedures used to restrict the amount of data that the sender can send before waiting for acknowledgment.

65. What is Error Control ?

Error control is both error detection and error correction. It allows the receiver to inform the sender of any frames lost or damaged in transmission and coordinates the retransmission of those frames by the sender. In the data link layer, the term error control refers primarily to methods of error detection and retransmission.

66. What Automatic Repeat Request (ARQ)?

Error control is both error detection and error correction. It allows the receiver to inform the sender of any frames lost or damaged in transmission and coordinates the retransmission of those frames by the sender. In the data link layer, the term error control refers primarily to methods of error detection and retransmission. Error control in the data link layer is often implemented simply: Any time an error is detected in an exchange, specified frames are retransmitted. This process is called automatic repeat request (ARQ).

67. What is Stop-and-Wait Protocol?

In Stop and wait protocol, sender sends one frame, waits until it receives confirmation from the receiver (okay to go ahead), and then sends the next frame.

68. What is Stop-and-Wait Automatic Repeat Request?

Error correction in Stop-and-Wait ARQ is done by keeping a copy of the sent frame and retransmitting of the frame when the timer expires.

69. What is usage of Sequence Number in Relaible Transmission?

The protocol specifies that frames need to be numbered. This is done by using sequence numbers. A field is added to the data frame to hold the sequence number of that frame. Since we want to minimize the frame size, the smallest range that provides unambiguous communication. The sequence numbers can wrap around.

70. 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.

71. What is Sliding Window?

The sliding window is an abstract concept that defines the range of sequence numbers that is the concern of the sender and receiver. In other words, he sender and receiver need to deal with only part of the possible sequence numbers.

72. 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.

73. What are the two types of transmission technology available?

(i) Broadcast and (ii) point-to-point

74. What is subnet?

A generic term for section of a large networks usually separated by a bridge or router.

75. Difference between the communication and transmission.

Transmission is a physical movement of information and concern issues like bit polarity, synchronisation, clock etc.

Communication means the meaning full exchange of information between two communication media.

76. What are the possible ways of data exchange?

(i) Simplex (ii) Half-duplex (iii) Full-duplex.

77. What is SAP?

Series of interface points that allow other computers to communicate with the other layers of network protocol stack.

78. What do you meant by "triple X" in Networks?

The function of PAD (Packet Assembler Disassembler) is described in a document known as X.3. The standard protocol has been defined between the terminal and the PAD, called X.28; another standard protocol exists between hte PAD and the network, called X.29. Together, these three recommendations are often called "triple X".

79. What is frame relay, in which layer it comes?

Frame relay is a packet switching technology. It will operate in the data link layer.

80. What is terminal emulation, in which layer it comes?

Telnet is also called as terminal emulation. It belongs to application layer.

81. 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.

82. What is redirector?

Redirector is software that intercepts file or prints I/O requests and translates them into network requests. This comes under presentation layer.

83. 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.

84. What is RAID?

A method for providing fault tolerance by using multiple hard disk drives.

85. 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.

86. What is Brouter?

Hybrid devices that combine the features of both bridges and routers.

87. What is cladding?

A layer of a glass surrounding the center fiber of glass inside a fiber-optic cable.

88. What is point-to-point protocol?

A communications protocol used to connect computers to remote networking services including Internet service providers.

89. How Gateway is different from Routers?

A gateway operates at the upper levels of the OSI model and translates information between two completely different network architectures or data formats.

90. What is attenuation?

The degeneration of a signal over distance on a network cable is called attenuation.

91. 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.

92. Difference between bit rate and baud rate.

Bit rate is the number of bits transmitted during one second whereas baud rate refers to the number of signal units per second that are required to represent those bits.
baud rate = (bit rate / N)
where N is no-of-bits represented by each signal shift.

93. 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.

94. What are the types of Transmission media?

Signals are usually transmitted over some transmission media that are broadly classified in to two categories.

a.) **Guided Media**: These are those that provide a conduit from one device to another that include twisted-pair, coaxial cable and fiber-optic cable. A signal traveling along any of these media is directed and is contained by the physical limits of the medium. Twisted-pair and coaxial cable use metallic that accept and transport signals in the form of electrical current. Optical fiber is a glass or plastic cable that accepts and transports signals in the form of light.

b.) **Unguided Media**: This is the wireless media that transport electromagnetic waves without using a physical conductor. Signals are broadcast either through air. This is done through radio communication, satellite communication and cellular telephony.

95. What is Project 802?

It is a project started by IEEE to set standards to enable intercommunication between equipment from a variety of manufacturers. It is a way for specifying functions of the physical layer, the data link layer and to some extent the network layer to allow for interconnectivity of major LAN protocols.

It consists of the following:

1. 802.1 is an internetworking standard for compatibility of different LANs and MANs across protocols.
2. 802.2 Logical link control (LLC) is the upper sublayer of the data link layer which is non-architecture-specific, that is remains the same for all IEEE-defined LANs.
3. Media access control (MAC) is the lower sublayer of the data link layer that contains some distinct modules each carrying proprietary information specific to the LAN product being used. The modules are Ethernet LAN (802.3), Token ring LAN (802.4), Token bus LAN (802.5).
4. 802.6 is distributed queue dual bus (DQDB) designed to be used in MANs.

96. What is Protocol Data Unit?

The data unit in the LLC level is called the protocol data unit (PDU). The PDU contains of four fields a destination service access point (DSAP), a source service access point (SSAP), a control field and an information field. DSAP, SSAP are addresses used by the LLC to identify the protocol stacks on the receiving and sending machines that are generating and using the data. The control field specifies whether the PDU frame is a information frame (I - frame) or a supervisory frame (S - frame) or a unnumbered frame (U - frame).

97. What are the different type of networking / internetworking devices?

1. **Repeater**: Also called a regenerator, it is an electronic device that operates only at physical layer. It receives the signal in the network before it becomes weak, regenerates the original bit pattern and puts the refreshed copy back in to the link.
2. **Bridges**: These operate both in the physical and data link layers of LANs of same type. They divide a larger network in to smaller segments. They contain logic that allow them to keep the traffic for each segment separate and thus are repeaters that relay a frame only the side of the segment containing the intended recipent and control congestion.
3. **Routers**: They relay packets among multiple interconnected networks (i.e. LANs of different type). They operate in the physical, data link and network layers. They contain software that enable them to determine which of the several possible paths is the best for a particular transmission.

4. **Gateways**: They relay packets among networks that have different protocols (e.g. between a LAN and a WAN). They accept a packet formatted for one protocol and convert it to a packet formatted for another protocol before forwarding it. They operate in all seven layers of the OSI model.

98. 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.

99. What are the data units at different layers of the TCP / IP protocol suite?

The data unit created at the application layer is called a message, at the transport layer the data unit created is called either a segment or an user datagram, at the network layer the data unit created is called the datagram, at the data link layer the datagram is encapsulated in to a frame and finally transmitted as signals along the transmission media.

100. 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.

101. 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.

102. What is the range of addresses in the classes of internet addresses?

Class A - 0.0.0.0 - 127.255.255.255
Class B - 128.0.0.0 - 191.255.255.255
Class C - 192.0.0.0 - 223.255.255.255
Class D - 224.0.0.0 - 239.255.255.255
Class E - 240.0.0.0 - 247.255.255.255

103. What is the difference between TFTP and FTP application layer protocols?

The Trivial File Transfer Protocol (TFTP) allows a local host to obtain files from a remote host but does not provide reliability or security. It uses the fundamental packet delivery services offered by UDP.

The File Transfer Protocol (FTP) is the standard mechanism provided by TCP / IP for copying a file from one host to another. It uses the services offer by TCP and so is reliable and secure. It establishes

two connections (virtual circuits) between the hosts, one for data transfer and another for control information.

104. What are major types of networks and explain?

1. **Server-based network**: provide centralized control of network resources and rely on server computers to provide security and network administration
2. **Peer-to-peer network**: computers can act as both servers sharing resources and as clients using the resources.

105. What are the important topologies for networks?

1. **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.
2. **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.
3. **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.

106. What is mesh network?

A network in which there are multiple network links between computers to provide multiple paths for data to travel.

107. 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.

108. Explain 5-4-3 rule?

In a Ethernet network, between any two points on the network ,there can be no more than five network segments or four repeaters, and of those five segments only three of segments can be populated.

109. What MAU?

In token Ring , hub is called Multistation Access Unit(MAU).

110. What is the difference between routable and non- routable protocols?

Routable protocols can work with a router and can be used to build large networks. Non-Routable protocols are designed to work on small, local networks and cannot be used with a router.

111. Why should you care about the OSI Reference Model?

It provides a framework for discussing network operations and design.

112. What is logical link control?

One of two sublayers of the data link layer of OSI reference model, as defined by the IEEE 802 standard. This sublayer is responsible for maintaining the link between computers when they are sending data across the physical network connection.

113. What is virtual channel?

Virtual channel is normally a connection from one source to one destination, although multicast connections are also permitted. The other name for virtual channel is virtual circuit.

114. What is virtual path?

Along any transmission path from a given source to a given destination, a group of virtual circuits can be grouped together into what is called path.

115. 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.

116. 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.

117. What is multicast routing?

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

118. What is region?

When hierarchical routing is used, the routers are divided into what we will call regions, with each router knowing all the details about how to route packets to destinations within its own region, but knowing nothing about the internal structure of other regions.

119. What is silly window syndrome?

It is a problem that can ruin TCP performance. This problem occurs when data are passed to the sending TCP entity in large blocks, but an interactive application on the receiving side reads 1 byte at a time.

120. What are Digrams and Trigrams?

The most common two letter combinations are called as digrams. e.g. th, in, er, re and an. The most common three letter combinations are called as trigrams. e.g. the, ing, and, and ion.

121. Expand IDEA.

IDEA stands for International Data Encryption Algorithm.

122. What is wide-mouth frog?

Wide-mouth frog is the simplest known key distribution center (KDC) authentication protocol.

123. What is Mail Gateway?

It is a system that performs a protocol translation between different electronic mail delivery protocols.

124. What is IGP (Interior Gateway Protocol)?

It is any routing protocol used within an autonomous system.

125. What is EGP (Exterior Gateway Protocol)?

It is the protocol the routers in neighboring autonomous systems use to identify the set of networks that can be reached within or via each autonomous system.

126. What is autonomous system?

It is a collection of routers under the control of a single administrative authority and that uses a common Interior Gateway Protocol.

127. What is BGP (Border Gateway Protocol)?

It is a protocol used to advertise the set of networks that can be reached with in an autonomous system. BGP enables this information to be shared with the autonomous system. This is newer than EGP (Exterior Gateway Protocol).

128. What is Gateway-to-Gateway protocol?

It is a protocol formerly used to exchange routing information between Internet core routers.

129. What is NVT (Network Virtual Terminal)?

It is a set of rules defining a very simple virtual terminal interaction. The NVT is used in the start of a Telnet session.

130. What is a Multi-homed Host?

It is a host that has a multiple network interfaces and that requires multiple IP addresses is called as a Multi-homed Host.

131. 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.

132. What is OSPF?

It is an Internet routing protocol that scales well, can route traffic along multiple paths, and uses knowledge of an Internet's topology to make accurate routing decisions.

133. What is Proxy ARP?

It is using a router to answer ARP requests. This will be done when the originating host believes that a destination is local, when in fact is lies beyond router.

134. What is SLIP (Serial Line Interface Protocol)?

It is a very simple protocol used for transmission of IP datagrams across a serial line.

135. What is RIP (Routing Information Protocol)?

It is a simple protocol used to exchange information between the routers.

136. What is source route?

It is a sequence of IP addresses identifying the route a datagram must follow. A source route may optionally be included in an IP datagram header.