

UNIT 1

- 1. What are the three criteria necessary for an effective and efficient network?**
The most important criteria are performance, reliability and security. Performance of the network depends on number of users, type of transmission medium, the capabilities of the connected h/w and the efficiency of the s/w. Reliability is measured by frequency of failure, the time it takes a link to recover from the failure and the network's robustness in a catastrophe. Security issues include protecting data from unauthorized access and viruses.
- 2. Group the OSI layers by function.**
The seven layers of the OSI model belonging to three subgroups. Network support layers: Consisting of Physical, data link and network layers and they deal with the physical aspects of moving data from one device to another. User support layers: Consists of Session, presentation and application layers and they allow interoperability among unrelated software systems. The transport layer ensures end-to-end reliable data transmission
- 3. What are the features provided by layering?**
 - It decomposes the problem of building a network into more manageable components. Rather than implementing a monolithic piece of software that does everything implement several layers, each of which solves one part of the problem.
 - It provides more modular design. To add some new service, it is enough to modify the functionality at one layer, reusing the functions provided at all the other layers.
- 4. What are the two interfaces provided by protocols?**
 - Service interface
 - Peer interface
 - Service interface-defines the operations that local objects can perform on the protocol.
 - Peer interface-defines the form and meaning of messages exchanged between protocol peers to implement the communication service.
- 5. What is LAN?**
A LAN is a common name used to describe a group of devices that share a geographic location. LAN is limited to single building or campus.
- 6. What is flow Control?**
Flow control refers to a set of procedures used to restrict the amount of data. The sender can send before waiting for acknowledgment.
- 7. Define Error detection and correction.**
Error Detection:
Data can be corrupted during transmission. It is called as an error. For reliable communication, the receiver must find out the errors occurred in the data which is called as error detection.
Error Correction:
It is the mechanism to correct the errors and it can be handled in 2 ways.
 - a) When an error is discovered, the receiver can have the sender retransmit the entire data unit.
 - b) A receiver can use an error correcting coder, which automatically corrects certain error.
- 8. What is the use of two dimensional parity in error detection?**
Two-dimensional parity check increases the likelihood of detecting burst errors. It is used to detect errors occurred in more than one bits.
- 9. What are the issues in data link layer?**
The data link layer has a number of specific functions it can carry out. These functions include,
 - a) Providing a well-defined service interface to the network layer.
 - b) Dealing with transmission errors.
 - c) Regulating the flow of data so that slow receivers are not swamped by fast senders.

10. What are the ways to address the framing problem?

The framing problem can be addressed by the following protocols:

- Byte-Oriented Protocols(PPP)
- Bit-Oriented Protocols(HDLC)
- Clock-Based Framing(SONET)

11. What are the responsibilities of data link layer?

Specific responsibilities of data link layer include the following.

- a) Framing
- b) Physical addressing
- c) Flow control
- d) Error control
- e) Access control

12. Mention the types of errors.

There are 2 types of errors

- a) Single-bit error.
- b) Burst-bit error.

13. Define the following terms.

Single bit error: The term single bit error means that only one bit of a given data unit (such as byte character/data unit or packet) is changed from 1 to 0 or from 0 to 1.

Burst error: Means that 2 or more bits in the data unit have changed from 1 to 0 from 0 to 1.

14. What is redundancy?

It is the error detecting mechanism, which means a shorter group of bits or extra bits may be appended at the destination of each unit.

15. What is the purpose of hamming code?

A hamming code can be designed to correct burst errors of certain lengths. So the simple strategy used by the hamming code to correct single bit errors must be redesigned to be applicable for multiple bit correction.

16. What is mean by error control?

Error control is a method that can be used to recover the corrupted data whenever possible. These are two basic types of error control which are backward error control and forward error control.

17. What is OSI?

A standard that specifies a conceptual model called Open systems Interconnection network interface model, which breaks networked communications into seven layers: Application, Presentation, Session, Transport, Network, Data link, Physical.

18. State the major functions performed by the presentation layer of the ISO OSI model.

(Nov Dec 2006)

Presentation layer is concerned with the format of data exchanged between peers, for example, whether an integer is 16, 32, or 64 bits long and whether the most significant bit is transmitted first or last, or how a video stream is formatted.

19. State the purpose of layering in networks? (May Jun 2007)

A layer is a collection of related functions that provides services to the layer above it and receives services from the layer below it.

To execute the functions by each layer is independent.

20. What are the two fundamental ways by which network performance is measured?

1. Bandwidth
2. Latency

PART - B

1. Explain ISO/OSI reference model.

- Physical layer
- Data link layer

- Network layer
- Transport layer
- Session layer
- Presentation layer
- Application layer

2. **Explain the topologies of the network.**

- Mesh topology
- Star topology
- Tree topology
- Bus topology
- Ring topology

3. **Explain the categories of networks.**

- Local Area Network(LAN)
- Metropolitan Area Network(MAN)
- Wide Area Network(WAN)

4. **Explain error detection and error correction techniques.**

Types of errors

- Single bit error
- Burst error

Error detection

- Vertical redundancy check(VRC)
- Longitudinal redundancy check(LRC)
- Cyclic redundancy check(CRC)
- Checksum

Error correction

- Single-bit error correction
- Hamming code
- Burst error correction

5. **Explain error control mechanism.**

- Stop and wait ARQ
- Sliding window ARQ
- Go back-n
- Selective-reject

UNIT - II

1. **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.

2. **What is DHCP?**

The Dynamic Host Configuration Protocol has been derived to provide dynamic configuration. DHCP is also needed when a host moves from network to network or is connected and disconnected from a network.

3. **Define ICMP**

Internet Control Message Protocol is a collection of error messages that are sent back to the source host whenever a router or host is unable to process an IP datagram successfully.

4. **What is the need of internetwork?**

To exchange data between networks, they need to be connected to make an Internetwork.

5. **What are the types of class full addressing?**

The types are Class A, Class B, Class C, Class D, and Class E

- 6. What do you mean by ARP?**
ARP stands for Address resolution protocol. ARP is a dynamic mapping method that finds a physical address for a given a logical address. i.e. mapping IP address to physical address.
- 7. What do you mean by RARP?**
RARP stands for Reverse Address resolution protocol, maps a MAC address to an IP address.
- 8. What are the functions of MAC?**
MAC sub layer resolves the contention for the shared media. It contains synchronization, flag, flow and error control specifications necessary to move information from one place to another, as well as the physical address of the next station to receive and route a packet.
- 9. Define the term medium access control mechanism**
The protocol that determines who can transmit on a broadcast channel are called medium access control (MAC) protocol. The MAC protocols are implemented in the Mac sub-layer which is the lower sub-layer of the data link layer.
- 10. What is bridge?**
Bridge is a hardware networking device used to connect two LANs. A bridge operates at data link layer of the OSI reference model.
- 11. What is a repeater?**
Repeater is a hardware device used to strengthen signals being transmitted on a network.
- 12. Define router**
A network layer device that connects networks with different physical media and translates between different network architecture.
- 13. What is a switch?**
A switch is a networking device that manages networked connections between devices on a star networks.
- 14. What is mean by Ethernet?**
Ethernet is a networking technology developed in 1970 which is governed by the IEEE 802.3 specifications.
- 15. Advantages of Ethernet**
1. Inexpensive
 2. Easy to install
 3. Supports various writing technologies.
- 16. Identify the class and default subnet mask of the IP address 217.65.10.7.**
IP Address 217.65.10.7 belongs to Class C. Its subnet mask is 255.255.255.0.
- 17. What are the limitations of bridges?**
1. Scale
 2. Heterogeneity
- 18. Define Bluetooth.**
Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices and building personal area networks (PANs).
- 20. What are the 3 levels of hierarchy in IP Addressing?**
1. Netid
 2. Subnetid
 3. Hostid
- 21. What are the functions of bridge?**
1. Connecting networks
 2. Filtering information so that network traffic for one portion of the network does not congest the rest of the network.

22. Define sub-netting

Sub-netting is a technique that allows a network administrator to divide one physical network into smaller logical networks and thus control the flow of traffic for security or efficiency reasons.

PART - B

1. Explain detail about IEEE 802.3 MAC sub-layer

- Frame format
- Frame length
- Ethernet specifications
- Manchester encoding
- Binary exponential Back off algorithm
- Ethernet performance

2. Explain detail about Bluetooth architecture

- Radio layer
- Baseband layer
- Frame format
- L2CAP
- Hidden Station Problem

3. Explain about IPv4 address

- Classful addressing
- Special IP addressing
- Classless addressing
- Header format
- IP fragmentation Options
- Sub-netting a network

4. Explain about Address resolution protocol Packet format

- Encapsulation
- Proxy ARP

5. Explain about RARP

- Frame Format of RARP
- Encapsulation

6. Explain about Internet Control Message Protocol

- Message types
- Message format
- Error Reporting
- Echo Request and reply
- Time stamp request and reply
- Address mask request and reply message.

7. Explain about Ethernet.

- Access method : CSMA/CD Addressing
- Electrical specification
- Frame format Implementation:
 - 10 base 5:Thick Ethernet
 - 10 base 2: Thin Ethernet,
 - 10 base T : Twisted-pair Ethernet
 - 1 base 5 : Star LAN

UNIT - III

1. What is routing?

Routing is a process of selecting paths in a network through which network traffic is sent.

2. Define an internetwork.

A collection of interconnected network is called an internetwork.

3. What does routing metric mean?

A routing metric is a unit calculated by a routing algorithm for selecting or rejecting a routing path for transferring data/traffic.

4. What are the metrics used in determining the best path for a routing protocol?

- Bandwidth
- Delay
- Load
- Reliability
- Cost
- Hop count
- MTU
- Ticks

5. What is multicasting?

Multicasting is the delivery of information to a group of destinations simultaneously using the most efficient strategy to deliver the messages over each link of the network only once.

6. What are different types of multicast routing?

1. Reverse path multicasting
2. Reverse path broadcasting

7. What is multicast? What is the motivation for developing multicast?

Multicasting means delivering the same packet simultaneously to a group of clients. Motivation for developing multicast is that there are applications that want to send a packet to more than one destination hosts.

8. Define RIP.

RIP is a dynamic protocol used for finding the best route or path from one-to-end over a network by using a routing metric/ hop count algorithm.

9. What is OSPF?

OSPF protocol is a router protocol used within larger autonomous system networks in preference to the Routing Information Protocol (RIP).

10. What are the features of OSPF?

- Authentication of routing messages
- Additional hierarchy
- Load balancing

11. Mention any four applications of multicasting

- Broad casts of audio and video
- Video conferencing
- Shared Applications.
- IGMP is used by multicast routers to keep track of membership in a multicast group.

12. Describe the process of routing packets

Routing is the act of moving information across an internetwork from a source to a destination.

13. What are the some routing algorithm types?

The routing types are static, dynamic, flat, hierarchical, host-intelligent, router- intelligent, intra-domain, inter-domain, link state and distance vector.

14. What is a benefit of DHCP?

- Simplicity: clients need to manual configuration.
- Mobility and hosts: Hosts may move between networks without reconfiguring.
- Mobility of network: Possible for internet service providers to reconfigure customers address transparently.
- Save address space if individual clients are not always active.

15. What are the 3 types of routing performed by BGP?

- Inter-autonomous system routing
- Intra-autonomous system routing

- Pass through autonomous system routing

16. What are the different kinds of multicast routing?

- DVMRP
- PIM
- MSDP
- MOSPF
- MBGP

17. Write the types of PIM.

- PIM Sparse mode
- PIM Dense mode
- Bidirectional PIM
- Source Specific Multicast (SSM)

18. How can the routing be classified?

The routing can be classified as,

- Adaptive routing
- Non-adaptive routing.

19. What are the salient features of IPv6?

Salient features are:

- Efficient and hierarchical addressing and routing infrastructures.
- IPv6 networks provide auto configuration capabilities.
- Better support for QOS.
- Large Address space.
- Stateless and stateful address configuration.

20. Write the BGP Message types.

- Open
- Update
- Notification
- Keep-alive

PART - B

1.Explain IP addressing method.

Internetwork protocol (IP) Datagram
Addressing Classes
Dotted decimal notation

2. Define routing & explain distance vector routing and link state routing.

Distance vector routing
Sharing information
Routing table:
Creating the table
Updating the table:
Updating algorithm
Link state routing:
Information sharing
Packet cost
Link state packet:
Getting information about neighbors
Initialization Link state database

3.Define bridge and explain the type of bridges.

Bridges:
Types of bridges

Simple bridge
Multi-port bridge
Transparent bridge

4. Explains sub-netting

Three levels of hierarchy masking
Masks without sub-netting
Masks with sub-netting
Finding the sub-network address
Boundary level masking
Non-boundary level masking

5. Write short notes about repeaters, routers and gateways.

Repeaters
Routers: Routing concepts
Least-cost routing
Non adaptive routing
Adaptive routing
Packet lifetime
Gateways

UNIT- IV

1. What are the fields on which the UDP checksum is calculated? Why?

UDP checksum includes a pseudo header, the UDP header and the data coming from the application layer.

2. What are the advantages of using UDP over TCP?

- UDP does not include the overhead needed to detect reliability
- It does not need to maintain the unexpected deception of data flow
- UDP requires less processing at the transmitting and receiving of hosts.
- It is simple to use for a network
- The OS does not need to maintain UDP connection information.

2. What is TCP?

TCP provides a connection oriented, reliable byte stream service. The connection oriented means the two applications using TCP must establish a TCP connection with each other before they can exchange data.

3. Define congestion

When too many packets rushing to a node or a part of network, the network performance degrades. This situation is called as congestion.

4. List the flag used in TCP header.

TCP header contains six flags. They are URG, ACK, PSH, RST, SYN, FIN

5. Give the approaches to improve the QoS.

Fine grained approaches, which provide QoS to individual applications or flows. Integrated services, QoS architecture developed in the IETE and often associated with RSVP.

6. What do you mean by QoS?

Quality of Service is used in some organizations to help provide an optimal end user experience for audio and video communications. QoS is most commonly used on networks where bandwidth is limited with a large number of network packets competing for a relatively small amount of available and width.

7. What is multiplexing?

The job of gathering data chunks at the sources host from different sockets, encapsulating each data chunks with header information to create segments, and passing the segments to the network layer is called multiplexing.

- 8. What is de-multiplexing?**
The job of delivering the data in a transport layer segment to the correct socket is called de-multiplexing.
- 9. What is RTT?**
RTT is an acronym for Round Trip Time: it is a measure of the time it takes for a packet to travel from a computer, across a network to another computer, and back.
- 10. What is the segment?**
Transport layer protocols send data as a sequence of packets. In TCP/IP these packets are called segments.
- 11. What is a port?**
Applications running on different hosts communicate with TCP with the help of a concept called as ports. A port is a 16 bit unique number allocated to a particular application.
- 12. List the services of end to end services.**
- Guarantee message delivery.
 - Delivery messages in the same order they are sent.
 - Deliver at most one copy of each message.
 - Support arbitrarily large message.
 - Support synchronization.
- 13. What is congestion?**
When load on network is greater than its capacity, there is congestion of data Packets. Congestion occurs because routers and switches have queues or buffers.
- 14. What are the functions of transport layer?**
- Breaks messages into packets.
 - Connection control.
 - Addressing.
 - Provide reliability.
- 15. What are the types of QoS tools?**
Classification Congestion management,
- Congestion avoidance
 - Shaping/policing
 - Link efficiency
- 16. List some ways to deal with congestion**
- packet elimination
 - Flow control
 - Buffer allocation
 - Choke packets
- 17. Define network congestion?**
When two or more nodes would simultaneously try to transmit packets to one node there is a high probability that the number of packets would exceed the packet handling capacity of the network and lead to congestion.
- 18. List the three types of addresses in TCP/IP.**
Three types of addresses are used by systems using the TCP/IP protocol: the physical address, the internetwork address (IP address), and the port address.
- 19. What is the flow characteristics related to QoS?**
The flow characteristics related to QoS are
- Reliability
 - Delay
 - Jitter

- Bandwidth

20. What are the techniques to improve QoS?

The techniques to improve QoS are

- Scheduling
- Traffic shaping
- Resource reservation
- Admission control

21. Define Socket address.

The combination of IP address and port address is called Socket address.

22. What are the two types of protocols used in Transport layer?

The two types of protocols used in Transport layer are

- TCP
- UDP

23. Define Throughput.

It is defines as a number of packets passing through the network in a unit of time.

24. Define UDP

User datagram protocol is a Unreliable, connectionless protocol, used along with the IP protocol.

25. What is the need of port numbers?

Port numbers are used as an addressing mechanism in transport layer.

26. What are the types of port numbers used in transport layer?

- Well-known port
- Registered port
- Dynamic port

27. Why TCP services are called Stream delivery services?

TCP allows the sending process to deliver data as a stream of bytes and the receiving process to deliver data as a stream of bytes. So it is called as stream of bytes.

28. Define jitter

Jitter is defined as a variation in the delay of received packets. The sending side transmits packets in a continuous stream and spaces them evenly apart. Because of network congestion, improper queuing, or configuration errors, the delay between packets can vary instead of remaining constant.

29. Compare connectionless service & connection oriented service

In connection less service there is no connection between transmitter & receiver Ex: UDP

In connection oriented service there is a connection between transmitter & receiver Ex: TCP

30. What is Unicast & Multicast communication?

- **Unicast communication** is one source sending a packet to one destination.
 - **Multicast communication** is one source sending a packet to multiple destinations.

PART - B

1. Explain the duties of transport layer.

- End to end delivery
- Addressing
- Reliable delivery
- Error control
- Sequence control
- Loss control
- Duplication control
- Flow control

2. Explain UDP & TCP.

User Datagram Protocol (UDP)

Source port address

Destination port address

Total length

Checksum

Transmission Control Protocol (TCP)

Source port address

Destination port address

Sequence number

Acknowledgement number

Header length

Reserved Control

Window size

Check sum

Urgent pointer

Options and padding

3. Explain about congestion control.

Congestion Control

BECN

FECN

Four situations

Discarding

4. Explain about Congestion Avoidance

DECbit scheme

RED

5. Explain detail about QoS Policing

Integrated service

Traffic Shaping

Admission Control

RSVP

Differentiated Services/Qos

UNIT - V

1. Define the two types of user agents in the electronic mail system

- Command driven: It normally accepts a one character command from the keyboard to perform its task.
- GUI based: They contain GUI components that allow the user to interact with the software by using both the keyword and mouse.

2. What is DNS?

DNS is a client/server application that identifies each host on the internet with a unique user friendly name.

3. What is the purpose of inverse domain?

The inverse domain is used to map an address to a name.

4. What is SMTP?

Simple Mail Transfer Protocol is a standard and reliable host to host mail transport protocol that operates over the TCP port 25.

5. State the Purpose of SNMP

The primary purpose of SNMP is to allow the network administrator to monitor and configure devices on the network, remotely via the network. These configuration and monitoring capabilities are collectively referred to as management.

6. What is the Domain name system responsible for?

The Domain Name system converts domain names (of the form www.vtubooks.com) into IP numbers.

7. What are the four main properties of HTTP?

- Global Uniform Resource Identifier
- Request response exchange.
- Statelessness.
- Resource meta data

8. What is SMTP used for?

SMTP is used when email is delivered from an email client, such as Outlook Express, to an email server or when email is delivered from one email server to another.

9. What is virtual terminal?

A virtual terminal is a data structure maintained by either the application software or a local terminal.

10. What are the basic functions of email?

Composition, Transfer, Reporting, Displaying and Disposition of mails.

11. Define WWW?

It is an internet application that allows users to view web pages and move from one web page to another.

12. What is the web browser?

Web browser is a software program that interprets and displays the contents of HTML web pages.

13. What is URL?

URL is a string identifier that identifies a page on the World Wide Web.

14. What do you mean by TELNET?

TELNET is used to connect remote computers and issue commands on those computers.

15. 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

- Network virtual Terminal,
- File transfer, access and Management (FTAM),
- Mail services,
- Directory Services

6. Write down the three types of WWW documents.

The documents in the WWW can be grouped into three broad categories: static, dynamic and active.

- A) *Static*: Fixed-content documents that are created and stored in a server.
- B) *Dynamic*: Created by web server whenever a browser requests the document.
- C) *Active*: A program to be run at the client side.

7. What is fully Qualified Domain Name?

If a label is terminated by a null string is called a Fully Qualified Domain Name.

8. What is Generic Domains?

Generic domain defines registered hosts according to their generic behavior. Each node in the tree defines a domain, which is an index to the domain name space database. Eg.-

- com – Commercial organizations,
- edu - Educational institutions,
- gov – Government Institutions.

9. **What is simple mail transfer protocol?**
The TCP/IP protocol that supports electronic mail on the internet is called Simple Mail Transfer Protocol (SMTP). It is a system for sending messages to other computer users based on email addresses.
20. **What do you mean by File transfer protocol?**
It is a standard mechanism provided by the internet for copying a file from one host to another.
21. **What are the two types of connections in FTP?**
The two types of connections in FTP are
- Control connection
 - Open connection
22. **Define HTTP.**
It is used mainly to access data on the World Wide Web. The protocol transfers data in the form of plaintext, hypertext, audio, video and soon.
23. **What are the types of messages in HTTP transaction?**
The types of messages in HTTP transaction are
- Request messages
 - Response messages
24. **What are the parts of a browser?**
The parts of a browser are
- A controller
 - A client program
 - Interpreter
25. **Name the four aspects of security.**
- Privacy
 - Authentication
 - Integrity
 - Non-repudiation
26. **What is POP?**
Post Office Protocol, version3 (POP3) and Internet Mail Access Protocol version4 (IMAP4) are protocol used by a mail server in conjunction with SMTP to receive and hold mail for hosts.
27. **What is the function of SMTP?**
The TCP/IP protocol supports electronic mail on the Internet is called Simple Mail Transfer (SMTP). It is a system for sending messages to other computer users based on email addresses. SMTP provides mail exchange between users on the same or different computers.
28. **How does MIME enhance SMTP?**
MIME is a supplementary protocol that allows non-ASCII data to be sent through SMTP. MIME transforms non-ASCII data at the sender site to NVT ASCII data and delivers it to the client SMTP to be sent through the Internet. The server SMTP at the receiving side receives the NVT ASCII data and delivers it to MIME to be transforming feed back to the original data.
29. **Why is an application such as POP needed for electronic messaging?**
Workstations interact with the SMTP host, which receives the mail on behalf of every host in the organization, to retrieve messages by using a client-server protocol such as Post Office Protocol, version 3(POP3). Although POP3 is used to download messages from the server, the SMTP client still needed on the desktop to forward messages from the workstation user to its SMTP mail server.

PART - B

1. **Explain the functions of SMTP.**
System for sending messages to other computer users based on e-mail addresses.
SMTP provides mail exchange between users on the same or different computers.
User Agent

Mail Transfer Agent
Multipurpose Internet Mail Extensions
Post Office Protocol

2. **Write short notes on FTP.**
Transfer a file from one system to another.
TCP connections
Basic model of FTP
3. **Explain about HTTP.**
HTTP transactions
HTTP messages
URL
4. **Explain the WWW in detail.**
Hypertext & Hypermedia
Browser Architecture
Categories of Web Documents
HTML
CGI Java
5. **Explain about Electronic mail**
Email addressing
Message headers
Formatted email
Functions of email
User agent and message transfer agent
Simple mail Transfer protocol
Multipurpose internet mail extensions
Post Office Protocol (POP)
IMAP
6. **Explain detail about Domain Name System**
Components of DNS
DNS in the internet Name space
Domain name Space Resolution
Message format Resource records
Name servers
Dynamic Domain Same system (DDNS)