

MARIA COLLEGE OF ENGINEERING AND TECHNOLOGY, ATTOOR

CS 52 COMPUTER NETWORKS

UNIT I (2 MARKS)

1. What is mean by data communication?

Data communication is the exchange of data (in the form of 1s and 0s) between two devices via some form of transmission medium (such as a wire cable).

2. 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.

3. What are the three fundamental characteristics determine the effectiveness of the data communication system?

The effectiveness of the data communication system depends on three fundamental characteristics:

Delivery: The system must deliver data to the correct destination.

Accuracy: The system must deliver data accurately.

Timeliness: The system must deliver data in a timely manner.

4. Group the OSI layers by function.

The seven layers of the OSI model belonging to three subgroups. Physical, data link and network layers are the network support layers; they deal with the physical aspects of moving data from one device to another. Session, presentation and application layers are the user support layers; they allow interoperability among unrelated software systems. The transport layer ensures end-to-end reliable data transmission.

5. What are header and trailers and how do they get added and removed?

Each layer in the sending machine adds its own information to the message it receives from the layer just above it and passes the whole package to the layer just below it. This information is added in the form of headers or trailers. Headers are added to the message at the layers 6,5,4,3, and 2. A trailer is added at layer2. At the

receiving machine, the headers or trailers attached to the data unit at the corresponding sending layers are removed, and actions appropriate to that layer are taken.

6. The transport layer creates a communication between the source and destination. What are the three events involved in a connection?

Creating a connection involves three steps: connection establishment, data transfer and connection release.

7. 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

8. Mention the types of errors.

There are 2 types of errors

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

9. Define the following terms.

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

10. 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.

11. List out the available detection methods.

There are 4 types of redundancy checks are used in data communication.

- a) Vertical redundancy checks (VRC).
- b) Longitudinal redundancy checks (LRC).
- c) Cyclic redundancy checks (CRC).
- d) Checksum.

12. Write short notes on VRC.

The most common and least expensive mechanism for error detection is the vertical redundancy check (VRC) often called a parity check. In this technique a redundant bit called a parity bit, is appended to every data unit so, that the total number of 0's in the unit (including the parity bit) becomes even.

13. Write short notes on LRC.

In longitudinal redundancy check (LRC), a block of bits is divided into rows and a redundant row of bits is added to the whole block.

14. Write short notes on CRC.

The third and most powerful of the redundancy checking techniques is the cyclic redundancy check (CRC). Burst error: Means that 2 or more bits in the data unit have changed from 1 to 0 from 0 to 1.

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- a) Vertical redundancy checks (VRC).
- b) Longitudinal redundancy checks (LRC).
- c) Cyclic redundancy checks (CRC).
- d) Checksum.

17. Write short notes on 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 errors.

18. Mention the types of error correcting methods.

There are 2 error-correcting methods.

- a) Single bit error correction

b) Burst error correction.

19. Define 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.

20. Mention the categories of flow control.

There are 2 methods have been developed to control flow of data across communication links.

- a) Stop and wait- send one from at a time.
- b) Sliding window- send several frames at a time.

21. What is the function of stop and wait flow control?

In this method, the sender sends one frame and waits for an acknowledgement before sending.

22. Mention the advantage and disadvantage of stop and wait flow control.

Advantage: simplicity
Disadvantage: inefficiency.

23. Define ARQ.

Error control in the data link layer is based on Automatic repeat request (ARQ), which means retransmission of data in 3 cases.

- a) Damaged frame
- b) Lost frame
- c) Lost acknowledgment.

24. Mention the function of go-back N-ARQ.

It is the popular mechanism for continuous transmission error control. In the method, if our frame is lost or damaged, all frames sent since the last frame acknowledged are retransmitted.

25. What is selective reject ARQ?

In selective reject ARQ only the specific damaged or lost frame is retransmitted. If a frame is corrupted in transit, a NAK is returned and the frame is resent out of sequence.

16 Marks

1. Explain the OSI layers in detail with neat diagram.
 - i. Physical
 - ii. Datalink
 - iii. Network
 - iv. Transport
 - v. Session
 - vi. Presentation
 - vii. Application.

2. What are the types of multiplexing and explain it in detail.
 - i. FDM
 - ii. WDM
 - iii. TDM

3. Explain about the hybrid multiple access techniques.
 - i. FDMA
 - ii. WDMA
 - iii. TDMA

4. Give the brief note about
 - a. Byte oriented protocol.
 - b. Bit oriented protocol.

5. What are the types of ARQ? Explain it in detail with neat sketch?
 - i. Normal operation
 - ii. Lost acknowledgement.
 - iii. Delayed acknowledgement

UNIT II (2 MARKS)

1. Define a standard 802.3

IEEE 802.3 supports a LAN standard originally developed by Xerox and later extended by a joint venture between digital equipment corporations. Intel Corporation and Xerox. This was called 'Ethernet'.

2. List the most common kinds of Base band 802.3 LAN.

- a) 10 Base 5
- b) 10 Base 2
- c) 10 Base T
- d) 1 Base 5
- e) 100 Base T

3. Mention the different kinds of Ethernet networks.

- a) Switched Ethernet
- b) Fast Ethernet
- c) Gigabit Ethernet

4. Write short notes on FDDI.

Fiber distributed data interface is a local area network protocol standardized by ANSI and ITU-T. It supports data rates of 100 Mbps and provides a high-speed alternative to Ethernet and token ring access method used here is token passing.

5. Describe the three HDLC station types?

The three HDLC station types are:

Primary station: The primary station has the complete control of the link. The Primary station sends commands to the secondary station.

Secondary station: The secondary station sends responses.

Combined station: The combined station is one which acts either as a primary or a Secondary, depending upon the nature and direction of the transmission. Combined station sends both commands and responses.

6. What is piggy backing?

Piggy backing means combining data to send and acknowledgement of the

frame received in one single frame.

Piggy backing can save bandwidth because the overhead from a data frame and an ACK frame can be combined into just one frame

7. Name the four types of S-frames?

The four types of S-frames are
Receive ready(RR). The value of the code sub field is 00
Receive not ready(RNR). The value of the code sub field is 10
Reject(REJ). The value of the code sub field is 01
Selective reject(SREJ). The value of the code sub field is 11

8. Name the five categories of U-frames?

The five categories of U-frames are

- _ Mode setting
- _ Unnumbered exchange
- _ Disconnection.
- _ Initialization mode.
- _ Miscellaneous mode

9. How token rotation time calculated from token holding time?

The fine difference between the time, when token is seized by a node in token ring and release the token by the same node is known as token rotation time.

10. What is transceiver?

Transceiver is a device which connects host adaptor to Ethernet cable. It receives and sends signal.

11. state the difference between THT and TRT.

THT: time taken by a node to hold the token during the data transfer in token ring.

TRT: time taken for a token to complete full rotation in the ring.

12. Write the difference between a bridge and router.

Bridge : it is a interconnecting device in network that connects two LANs, of same type.

Router : it maintains a forwarding table that forwards packet to all nodes connected in the destination segment.

13. 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.

14. What is protocol data unit?

The data unit in the LLC level is called Protocol Data Unit (PDU). It contains four fields.

- Destination Service Point Address (DSAP)

- Source Service Access Point

Other layers

Network

Data link

Physical

Other layers

Network

Logical Link Control

Media Access Control

Physical

DSAP SSAP Control Information

- Control field

- Information field

15. What are headers and trailers and how do they get added and removed?

The control data added to the beginning of a data is called headers. The control data added to the end of a data is called trailers. At the sending machine, when

the message passes through the layers each layer adds the headers or trailers. At the receiving machine, each layer removes the data meant for it and passes the rest to the next layer.

16. What are the responsibilities of network layer?

The network layer is responsible for the source-to-destination delivery of packet across multiple network links. The specific responsibilities of network layer

include the following:

- Logical addressing.
- Routing.

17. What is a virtual circuit?

A logical circuit made between the sending and receiving computers. The connection is made after both computers do handshaking. After the connection, all packets follow the same route and arrive in sequence.

18. What are data grams?

In datagram approach, each packet is treated independently from all others. Even when one packet represents just a place of a multipacket transmission, the network treats it although it existed alone. Packets in this technology are referred to as datagram.

19. What are the two types of implementation formats in virtual circuits?

Virtual circuit transmission is implemented in 2 formats.

- Switched virtual circuit
- Permanent virtual circuit.

20. What is meant by switched virtual circuit?

Switched virtual circuit format is comparable conceptually to dial-up line in circuit switching. In this method, a virtual circuit is created whenever it is needed and exists only for the duration of specific exchange.

16 Marks

1. Explain the two approaches of packet switching techniques.

- Datagram approach
- Virtual circuit approach
- Switched virtual circuit(SVC)
- Permanent virtual circuit(PVC)
- Circuit – switched connection versus virtual – circuit connection
- Path versus route
- Dedicated versus shared

2. Explain IP addressing method.

- Internetwork protocol (IP)
- Datagram
- Addressing
- Classes
- Dotted decimal notation
- A sample internet

3. 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

4. Define bridge and explain the type of bridges.

- _ Bridges
- _ Types of bridges
- _ Simple bridge
- _ Multiport bridge
- _ Transparent bridge

5. Explain subnetting

- _ Subnetting
- _ Three levels of hierarchy
- _ Masking
- _ Masks without subnetting
- _ Masks with subnetting
- _ Finding the subnetwork address
- _ Boundary level masking
- _ Non-boundary level masking

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

- _ Repeaters
- _ Routers
- _ Routing concepts
- _ Least-cost routing

- _ Non adaptive routing
- _ Adaptive routing
- _ Packet lifetime
- _ Gateways

UNIT III (2marks)

1. What are the network support layers and the user support layers?

Network support layers:

The network support layers are Physical layer, Data link layer and Network layer. These deal with electrical specifications, physical connection, transport timing and reliability.

User support layers:

The user support layers are: Session layer, Presentation layer, Application layer. These allow interoperability among unrelated software systems.

2. With a neat diagram explain the relationship of IEEE Project to the OSI model?

The IEEE has subdivided the data link layer into two sub layers:

- * Logical link control (LLC)
- * Medium access control (MAC)

LLC is non-architecture specific. The MAC sub layer contains a number of distinct modules, each carries proprietary information specific to the LAN product being used.

3. What are the functions of LLC?

The IEEE project 802 model takes the structure of an HDLC frame and divides it into 2 sets of functions. One set contains the end user portion of the HDLC frame - the

logical address, control information, and data. These functions are handled by the IEEE

802.2 logical link control (LLC) protocol.

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Address (DSAP)

- Source Service Access Point

Other layers

Network

Data link

Physical

Other layers

Network

Logical Link Control

Media Access Control

Physical

DSAP SSAP

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Switched virtual circuit format is comparable conceptually to dial-up line in circuit switching. In this method, a virtual circuit is created whenever it is needed and exits only for the duration of specific exchange.

12. What is meant by Permanent virtual circuit?

Permanent virtual circuits are comparable to leased lines in circuit switching. In this method, the same virtual circuit is provided between two users on a continuous basis. The circuit is dedicated to the specific uses.

13. Define Routers.

Routers relay packets among multiple interconnected networks. They route packets from one network to any of a number of potential destination networks on internet routers operate in the physical, data link and network layer of OSI model.

14. What is meant by hop count?

The pathway requiring the smallest number of relays, it is called hop-count routing, in which every link is considered to be of equal length and given the value one.

15. How can the routing be classified?

The routing can be classified as,

- Adaptive routing
- Non-adaptive routing.

16. What is time-to-live or packet lifetime?

As the time-to-live field is generated, each packet is marked with a lifetime, usually the number of hops that are allowed before a packet is considered lost and accordingly, destroyed. The time-to-live determines the lifetime of a packet.

17. What is meant by brouter?

A brouter is a single protocol or multiprotocol router that sometimes act as a router and sometimes act as a bridge.

18. Write the keys for understanding the distance vector routing.

The three keys for understanding the algorithm are

- Knowledge about the whole networks
- Routing only to neighbors
- Information sharing at regular intervals

19. Write the keys for understanding the link state routing.

The three keys for understanding the algorithm are

- Knowledge about the neighborhood.
- Routing to all neighbors.

- Information sharing when there is a range.

20. How the packet cost referred in distance vector and link state routing?

In distance vector routing, cost refer to hop count while in case of link state routing, cost is a weighted value based on a variety of factors such as security levels, traffic

or the state of the link.

21. How the routers get the information about neighbor?

A router gets its information about its neighbors by periodically sending them a short greeting packets. If the neighborhood responds to the greeting as expected, it is

assumed to be alive and functioning. If it dose not, a change is assumed to have occurred

and the sending router then alerts the rest of the network in its next LSP.

22. What are the four internetworking devices?

The four internetworking devices are,

- Repeaters

23. Define IP address.

IP address is the 3-bit number for representing a host or system in the network.

One portion of the IP address indicates a networking and the other represents the host in

a network.

24. What is Token Bus?

Token Bus is a physical bus that operates as a logical ring using tokens.

Here stations are logically organized into a ring. A token is passed among stations.

If a

station wants to send data, it must wait and capture the token. Like Ethernet, station

communicates via a common bus.

25. What is token passing?

Stations may attempt to send data multiple times before a transmission makes it onto a link. This redundancy may create delays of indeterminable length if the

traffic is heavy. Token ring resolves this uncertainty by requiring that stations take turns

sending data. Each station may transmit only during its turn and may send only one frame

during each turn. The mechanism that coordinates this rotation is called token passing.

26. Define Masking?

Masking is the process that extracts the address of the physical network from an IP address.

27. What are the rules of boundary-level masking?

The rules of boundary-level masking

- The bytes in the IP address that corresponds to 255 in the mask will be repeated in the subnetwork address
- The bytes in the IP address that corresponds to 0 in the mask will change to 0 in the subnetwork address

28. What are the rules of nonboundary-level masking?

- The bytes in the IP address that corresponds to 255 in the mask will be repeated in the subnetwork address
- The bytes in the IP address that corresponds to 0 in the mask will change to 0 in the subnetwork address
- For other bytes, use the bit-wise AND operator

29. Define Gateway.

A device used to connect two separate networks that use different communication protocols.

30. What is LSP?

In link state routing, a small packet containing routing information sent by a router

16 mark

1. Discuss in detail about packet switching and circuit switching.

- i. virtual
- ii. datagram

2. Explain about the IP address.

- i. classes with ranges.
- ii. netid and hosted.
- iii. network address.

3. Explain in detail about the OSPF.

- i. link state routing.

- ii. generate routing table

4. Give a detail note on (i) ARP

- i. request/reply
- ii. packet format

(ii) RARP.

- i. request / reply
- ii. broadcast and unicast.

5. Congestion avoidance in network layer.

- i. congestion control time scale.
- ii. mechanism for congestion control.
- iii. Implicit
- iv. Explicit.
- v. Backpressure
- vi. Choke packets.

UNIT IV (2 MARKS)

1. What is function of transport layer?

The protocol in the transport layer takes care in the delivery of data from one application program on one device to an application program on another device. They act as a link between the upper layer protocols and the services provided by the lower layer.

2. What are the duties of the transport layer?

The services provided by the transport layer
End-to- end delivery
Addressing
Reliable delivery

Flow control
Multiplexing

3. What is the difference between network layer delivery and the transport layer delivery?

Network layer delivery Transport layer delivery

The network layer is responsible for the the source-to-destination delivery of packet across multiple network links.

The transport layer is responsible for source-to-destination delivery of the entire message.

4. What are the four aspects related to the reliable delivery of data?

The four aspects are,
Error control
Sequence control
Loss control
Duplication control

5. What is meant by segment?

At the sending and receiving end of the transmission, TCP divides long transmissions into smaller data units and packages each into a frame called a segment.

6. What is meant by segmentation?

When the size of the data unit received from the upper layer is too long for the network layer datagram or data link layer frame to handle, the transport protocol divides it into smaller usable blocks. The dividing process is called segmentation.

7. What is meant by Concatenation?

The size of the data unit belonging to a single session are so small that several can fit together into a single datagram or frame, the transport protocol combines them into a single data unit. The combining process is called concatenation.

8. What are the types of multiplexing?

The types of multiplexing are,
Upward multiplexing
Downward multiplexing

9. What are the two possible transport services?

Two basic types of transport services are,
Connection service

Connectionless services

10. The transport layer creates the connection between source and destination. What are the three events involved in the connection?

For security, the transport layer may create a connection between the two end ports. A connection is a single logical path between the source and destination that is associated with all packets in a message. Creating a connection involves three steps:

- Connection establishment
- Data transfer & Connection release.

11. What are the techniques used in multiplexing?

The three basic techniques of multiplexing are,
Frequency-division multiplexing
Time-division multiplexing
Wave-division multiplexing

12. What is meant by congestion?

Congestion in a network occurs if users send data into the network at a rate greater than that allowed by network resources.

13. Why does congestion occur in network?

Congestion occurs because the switches in a network have a limited buffer size to store arrived packets.

14. How will the congestion be avoided?

The congestion may be avoided by two bits
BECCN - Backward Explicit Congestion Notification
FECCN - Forward Explicit Congestion Notification

15. What is the function of BECCN BIT?

The BECCN bit warns the sender of congestion in network. The sender can respond to this warning by simply reducing the data rate.

16. What is the function of FECCN?

The FECCN bit is used to warn the receiver of congestion in the network. The sender and receiver are communicating with each other and are using some types of flow control at a higher level.

17. What is meant by quality of service?

The quality of service defines a set of attributes related to the performance of the connection. For each connection, the user can request a particular attribute each service class is associated with a set of attributes.

18. What are the two categories of QoS attributes?

The two main categories are
User Oriented
Network Oriented

19. List out the user related attributes?

User related attributes are
SCR – Sustainable Cell Rate
PCR – Peak Cell Rate
MCR- Minimum Cell Rate
CVDT – Cell Variation Delay Tolerance

20. What are the networks related attributes?

The network related attributes are,
Cell loss ratio (CLR)
Cell transfer delay (CTD)
Cell delay variation (CDV)
Cell error ratio (CER)

21. What is frame?

A frame consists of one complete cycle of time slots, including one or more slot dedicated to each sending device.

22. What is interleaving?

The switch moves from device to device at a constant rate and fixed order. This process is called interleaving.

23. What is framing bits?

One or more synchronization bits are usually added to the beginning of each frame. These bits are called framing bits.

24. What is the difference between service point address, logical address and physical address?

Service point addressing Logical addressing Physical addressing

The transport layer header includes a type of address called a service point address or port address, If a packet passes the network boundary we need another addressing to differentiate the source and If the frames are to be distributed to different systems on the network, the data link layer adds the which makes a data delivery from a specific process on one computer to a specific process on another computer. Destination systems. The network layer adds a header, which indicate the logical address of the sender and receiver. header, which defines the source machine's address and the destination machine's address.

16 marks

1. Explain the duties of transport layer.

End to end delivery

Addressing

Reliable delivery

- Error control
- Sequence control
- Loss control
- Duplication control
- Flow control
- Multiplexing

2. Explain socket in detail.

- Introduction
- Explanation
- program

3. 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

4. Explain about congestion control.

_ Congestion avoidance

- _ BECN
- _ FECN
- _ Four situations
- _ Discarding

5. Explain leaky bucket and token bucket algorithm

- _ Leaky bucket algorithm
- _ Leaky bucket
- _ Switch controlling the output rat

UNIT 5

1. What is the purpose of Domain Name System?

Domain Name System can map a name to an address and conversely an address to name.

2. Discuss the three main division of the domain name space.

Domain name space is divided into three different sections: generic domains, country domains & inverse domain.

Generic domain: Define registered hosts according to their generic behavior, uses generic suffixes.

Country domain: Uses two characters to identify a country as the last suffix.

Inverse domain: Finds the domain name given the IP address.

3. Discuss the TCP connections needed in FTP.

FTP establishes two connections between the hosts. One connection is used for data transfer, the other for control information. The control connection uses very simple rules of communication. The data connection needs more complex rules due to the variety of data types transferred.

4. Discuss the basic model of FTP.

The client has three components: the user interface, the client control process, and the client data transfer process. The server has two components: the server control process and the server data transfer process. The control connection is made between the control processes. The data connection is made between the data transfer processes.

5. 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 e-mail addresses. SMTP provides mail exchange between users on the same or different computers.

6. What is the difference between a user agent (UA) and a mail transfer agent (MTA)?

The UA prepares the message, creates the envelope, and puts the message in the envelope. The MTA transfers the mail across the Internet.

7. 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 transformed back to the original data.

8. 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.

10. Give the format of HTTP response message.

- Status Line
- Headers
- A Blank Line
- Body

11. Write down the three types of WWW documents.

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

Static: Fixed-content documents that are created and stored in a server.

Dynamic: Created by web server whenever a browser requests the document.

Active: A program to be run at the client side.

12. What is the purpose of HTML?

HTML is a computer language for specifying the contents and format of a web document. It allows additional text to include codes that define fonts, layouts, embedded graphics and hypertext links.

13. Define CGI.

CGI is a standard for communication between HTTP servers and executable programs. It is used in crating dynamic documents.

14. Name four factors needed for a secure network.

Privacy: The sender and the receiver expect confidentiality.

Authentication: The receiver is sure of the sender's identity and that an imposter has not sent the message.

Integrity: The data must arrive at the receiver exactly as it was sent.

Non-Reputation: The receiver must be able to prove that a received message came from a specific sender.

15. How is a secret key different from public key?

In secret key, the same key is used by both parties. The sender uses this key and an encryption algorithm to encrypt data; the receiver uses the same key and the corresponding decryption algorithm to decrypt the data. In public key, there are two keys: a private key and a public key. The private key is kept by the receiver. The public key is announced to the public.

16. What is a digital signature?

Digital signature is a method to authenticate the sender of a message. It is similar to that of signing transactions documents when you do business with a bank. In network transactions, you can create an equivalent of an electronic or digital signature by the way you send data.

17. What are the advantages & disadvantages of public key encryption?

Advantages:

a) Remove the restriction of a shared secret key between two entities. Here each entity can create a pair of keys, keep the private one, and publicly distribute the other one.

b) The no. of keys needed is reduced tremendously. For one million users to communicate, only two million keys are needed.

Disadvantage:

If you use large numbers the method to be effective. Calculating the cipher text using the long keys takes a lot of time. So it is not recommended for large amounts of text.

18. What are the advantages & disadvantages of secret key encryption?

Advantage:

Secret Key algorithms are efficient: it takes less time to encrypt a message. The reason is that the key is usually smaller. So it is used to encrypt or decrypt long messages.

Disadvantages:

- a) Each pair of users must have a secret key. If N people in world want to use this method, there needs to be $N(N-1)/2$ secret keys. For one million people to communicate, a half-billion secret keys are needed.
- b) The distribution of the keys between two parties can be difficult.

19. Define permutation.

Permutation is transposition in bit level.

Straight permutation: The no. of bits in the input and output are preserved.

Compressed permutation: The no. of bits is reduced (some of the bits are dropped).

Expanded permutation: The no. of bits is increased (some bits are repeated).

20. Define substitutional & transpositional encryption.

Substitutional: A character level encryption in which each character is replaced by another character in the set.

Transpositional: A Character level encryption in which the characters retain their plaintext but the position of the character changes.

16 marks

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 the type of encryption/decryption method.

Conventional Methods:

- Character-Level Encryption: Substitutional & Transpositional
- Bit-Level Encryption: Encoding/Decoding, Permutation, Substitution,
- Product, Exclusive-Or & Rotation

Public key Methods

6. Explain about RSA algorithm.

- Public key Encryption technique.
- Encryption algorithm
- Decryption algorithm
- Security in RSA

7. Explain about secret key encryption algorithm.

- Data Encryption Standard
- Algorithm
- Sub key generation