CS6551-COMPUTER NETWORKS
FOCUSSED QUESTION
BANK

UNIT – I FUNDAMENTALS & LINK LAYER
2 MARKS

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 and Physical.

16 MARKS

1. Explain ISO/OSI reference model.

Physical layer, Data link layer,Network layer,Transport layer,Session layer, Presentation layer and Application layer

2. Explain the topologies of the network.

Mesh topology,Star topology,Tree topology,Bus topology and Ring topology

3. Explain the categories of networks.

Local Area Network(LAN),Metropolitan Area Network(MAN) and Wide Area Network(WAN)

4. Explain error detection and error correction techniques.

Types of errors - Single bit error and Burst error

Error detection - Vertical redundancy check(VRC), Longitudinal redundancy check(LRC),Cyclic redundancy check(CRC) and Checksum

Error correction - Single-bit error correction, Hamming code and Burst error correction

5. Explain error control mechanism.

Stop and wait ARQ

Sliding window ARQ

Go back-n

Selective-reject

6. Explain the flow control mechanism

Stop and wait

Sliding window.

UNIT 2 MEDIA ACCESS & INTERNETWORKING
2 MARKS

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, Class E

6. What do you mean by ARP?

Address resolution protocol(ARP) maps an IP address to a MAC address

7. What do you mean by RARP?

Reverse Address resolution protocol(RARP) maps an MAC address to a 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 sublayer which is the lower sublayer 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 networks.

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 specification.

15. What are the advantages of Ethernet?

1.Inexpensive 2.Easy to install 3.Supports various writing technologies.

16 MARKS

1. 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

2.Explain in detail about IEEE 802.3

MAC sublayer,Frame format, Frame length,Ethernet specifications,Manchester encoding, Binary exponential Backoff algorithm,Ethernet performance

3.Explain in detail about Bluetooth.

Bluetooth architecture - Radio layer,Baseband layer
Frame format, L2CAP,Hidden Station Problem

4.Explain about IPv4 address

Classful addressing,Special IP addressing
Classless addressing
Header format,IP fragmentation,Options
Subnetting a network

5.Explain about Address resolution protocol.

Packet format
Encapsulation
Proxy ARP

6.Explain about RARP

Frame Format of RARP
Encapsulation

7.Explain about Internet Control Message Protocol.

Message types
Message format
Error Reporting
Echo Request and reply
Timestamp request and reply
Address mask request and reply message.

UNIT 3 ROUTING
2 MARKS

1.What is routing?

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

2. What is the purpose of address resolution protocol(ARP)?

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.

3. Define an internetwork

A collection of interconnected netwoek is called an internetwork.

4. State the duties of network layer

1.Responsible for the source to destinatination delivery of a packet.

2.Logical addressing

3.Routing

5.What is multicasting?

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 broad casting

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 wants to send a packet to more than one destination hosts.

8. Define subnetting.

Subnetting 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.

9. Mention any four applications of multicasting.

1.Broad casts of audio and video

2.videoconferencing

3.Shared Applications.

4.IGMP is used by multicast routers to keep track of membership in a multicast group.

10.Describe the process of routing packets

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

11.What are the some routing algorithm types?

Static, dynamic, flat, hierarchical, host- intelligent,router- intelligent,intra domain, inter domain,link state and distance vector.

12. What is a benefit of DHCP?

1.simplicity:clients need to manual configuration.

2.Mobility and hosts:Hosts may move between networks without reconfiguring.

3.Mobility of network:Possible for Internet service providers to reconfigure customers address transparently.

4.Save address space if individual clients are not always active.

13.What are the services offered by network layer?

1.logical addressing 2.Routing.

14. What are datagrams?

Packets in the IP layer are called datagrams.

15. What is IP addressing?

An IP address is a numerical label assigned to each divide in a computer network that uses Internet protocol for communication.Two important functions at IP address 1.Host identification 2.Location addressing

16.How can the routing be classified?

The routing can be classified as,

1) Adaptive routing 2) Non-adaptive routing.

17. What are the salient features of IPv6?

Salient features are :

1.Efficient and hierarchical addressing and routing infrastructures.

2.IPv6 networks provide auto configuration capabilities.

3.Better support for QOS.

4.Large Address space.

5.Stateless and stateful address configuration.

16 MARKS

1. Explain IP addressing method.

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

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,Multiport bridge,Transparent bridge

4. Explain subnetting.

Subnetting

Three levels of hierarchy - Masking,Masks without and with subnetting

Finding the subnetwork 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 and Gateways

6.Explain in detail about Global internet

BGP - Comparison between RIP and OSPF

7.Explain multicast routing.

DVMRP

PIM

UNIT 4 TRANSPORT LAYER
2 M ARKS

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

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

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

Does not include the overhead needed to detect and maintain connection oriented semantics.

3. 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.

4. Define congestion.

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

5. List the flag used in TCP header?

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

6. Give the approaches to improve the QOS.

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

7. 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 bandwidth.

8. What is multiplexing?

The job of gathering data chunks at the sourcs 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.

9. What is the demultiplexing?

The job of delivering the data in a transport layer segment to the correct socket is called demultiplexing.

10. 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.

11. What is the segment?

Transport layer protocols send data as a sequence of packets.In TCP/IP these packets are called segments.

12. 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.

13. List the services of end to end services.

1.Guarantee message delivery.

2.Delivery messages in the same order they are sent.

3.Deliver at most one copy of each message.
4.Support arbitrarily large message.
5.Support synchronization.

14. 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.

15. What are the functions of transport layer?

1.Breaks messages into packets.
2.connection control
3.addressing
4.Provide reliability

16. What are the types of QOS tools?

Classification,Congestion management,Congestion avoidance,Shaping/policing Link efficiency.

17. List some ways to deal with congestion

1.Packet elimination 2.Flow control 3.Buffer allocation 4.Choke packets

18. Define a 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.

19. Explain 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

20. What are the flow characteristics related to QOS?

The flow characteristics related to QOS are reliability,delay,jitter and bandwidth

21. What are the techniques to improve QOS?

The techniques to improve QOS are Scheduling,Traffic shaping,Resource reservation and Admission control.

22. Define Socket address

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

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

The two types of protocols used in Transport layer are TCP and UDP

24. Define Throughput.

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

25. Define UDP.

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

26. What is the need of port numbers?

Port numbers are used as a addressing mechanism in transport layer

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

· Well-known port
· Registered port
· Dynamic port

28. 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.

29. Define jitter.

It is the variation in delay for packets belonging to same flow.

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.

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 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 avoidance - 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

UNIT 5 APPLICATION LAYER

2 MARKS

1. Define the 2 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 Domain name system?

The Domain name system converts domain names (www.google.com) into IP address.

7. What are the four main properties of of HTTP?

1.Global Uniform Resource Identifier
2.Request response exchange.
3.Statelessness.
4.Resource metadata

8.What is SMTP used for?

The protocol used for sending mail.

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,Disposition.

11.Define www.

It is an internet application that allows users to wiew 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?

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

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

16. 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

17. What is Fully Qualified Domain Name?

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

18. What is Generic Domains?

Generic domain define registered hosts according to their generic behaviour. 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

19. 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 and Data connection.

22. Define HTTP.

It is used mainly to access data on the World Wide Web. The protocol transfer data in the form of plaintext, hypertext, audio, video and so on

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 deliverers 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 transform 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.

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 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

LDAP

Dynamic domain name system(DDNS)