**CS3591-COMPUTER NETWORKS**

**UNIT-I INTRODUCTION AND APPLICATION LAYER**

PART-A

**1. Define Full Duplex and simplex transmission system.**

With Full duplex transmission, two stations can simultaneously send and receive data from each other. This mode is known as two-way simultaneous. The signals are transmitted in only one direction. One is the sender and another is the receiver.

**2. Define networks.(Nov 12)**

A computer network is a group of computer systems and other computing hardware devices that are linked together through communication channels to facilitate communication and resource-sharing among a wide range of users. Networks are commonly categorized based on their characteristics.

**3. Write the parameters used to measure network performance. (May 16)**

The parameters used to measure network performance are Latency, Throughput, Delay and Bandwidth.

**4. What are the four fundamental characteristics that the data communication system depends on?**

The four fundamental characteristics are: Delivery, Accuracy, Timeliness and Jitter.

**5. What are the five components of data communications system?**

The five components are Message, Sender, Receiver, Transmission Medium and Protocol.

**6. Define link and state the types of connection.**

A link is the communication pathway that transfers data from one device to another.

The two possible types of connections are point to point and multipoint

**7. Define point to point and Multipoint.**

Point to point – A point to point connection provides a dedicated link between two devices

Multipoint – A multipoint connection is one in which more than two specific devices share a single link.

**8. What is Network topology? List its types. (Nov 21)**

Network topology is the interconnected pattern of network elements. A network topology may be physical, mapping hardware configuration, or logical, mapping the path that the data must take in order to travel around the network. The types are Bus topology, Star topology ,Mesh topology and Ring Topology.

**9. What are the major duties of Network Layer? (May 12)**

It is used to send the data from source to destination with help of logical address.

**10. What is OSI?**

OSI (Open Systems Interconnection) is reference model for how applications can communicate over a network. It is partitioned into seven layers. It was developed by the

International Organization for Standardization (ISO).

**UNIT-II TRANSPORT LAYER**

PART-A

**1. List the advantages of a centralized scheme.**

* It may afford greater control over access for priorities, overrides, and guaranteed capacity.
* It enables the use of relatively simple access logic at each station.
* It avoids problems of distributed coordination among peer entities.

**2. Mention some of the physical properties of Ethernet. (May 11)**

The Ethernet is a multiple-access network, meaning that a set of nodes send and receive frames over a shared link. An Ethernet is like a bus that has multiple stations plugged into it.

**3. When a transmitting station will insert a new token on the ring?**

It will insert a new token when the station has completed transmission of its frame.

The leading edge of the transmitted frame has returned to the station.

**4. List the rules for CSMA/CD.**

1) If the medium is idle, transmit; otherwise go to step 2.

2) If the medium is busy, continue to listen until the channel is idle, and then transmit immediately.

3) If a collision detected during transmission, transmit a brief jamming signal to all station to indicate collision has occurred and then cease transmission.

**5. What is Early Token Release (ETR)?**

ETR allows a transmitting station to release a token as soon as it completes frame transmission, whether or not the frame header has returned to the station.

**6. What is CSMA/CD? (Nov 11)**

Carrier Sense Multiple Access with Collision Detection is one of the methods of medium access. It is used to sense whether a medium is busy before transmission. If the medium is busy, it refrains from transmitting the data or else proceeds with the transmission. Also has the ability to check whether a transmission has collided with another.

**7. What is a bridge? (Nov 11)**

Bridge is a hardware networking device used to connect two LANs. A bridge operates a data link layer of the OSI layer. A bridge observes and forwards all frames that it receives It does forwarding & filtering frames using LAN destination address. Bridges are used t connect LAN or WAN and works at data link layer level. Collision Probability is more.

**8. What does IEEE 10 Base 5 standard signify?**

10 represents data rate 10 Mbps , 5 refers to segment length 5\* 100 m that can run without repeaters .Base represents Base band communication.

**9. What is meant by the contention period of Ethernet? How many lines are required to connect n systems in Direct Mesh topology?**

When several stations on an Ethernet have data to send, there are contention periods during which collisions happen and no data is successfully transmitted. n (n-1)/2 lines are required.

**10. Define Repeater and Hub.**

Repeaters and hubs are interconnecting devices.

Repeater: Repeaters extends the Ethernet segment and it repeats the signal. It does not amplify the signal.

Hub: A Hub has several point to point segments coming out. It is a multi way repeater.

It broadcasts any signal through all outgoing lines.

**UNIT-III NETWORK LAYER**

PART-A

**1. Write on the packet cost referred in distance vector and link state routing. (May 12)**

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.

**2. What is source routing? (Nov 13)**

Source routing is a specific routing process where senders can specify the route that data packets take through a network. This allows for troubleshooting and various transmission goals.Source routing is also known as path addressing. Rotation, stripping off and using pointers are the different types of source routing approach.

**3. Define routing. (Nov 12,15)**

It is the process of building up the tables that allow the collect output for a packet to be determined. It is a lot harder to create the forwarding tables in large, complex networks with dynamically changing topologies and multiple paths between destinations.

Routing is a process that takes place in the background so that, when a data packet turns

up, we will have the right information in the forwarding table to be able to forward, or switch, the packet.

**4. What is the network address in a class A subnet with the IP addresses of one of the hosts as 25.34.12.56 and mask 255.255.0.0? (May 14) (Nov 21)**

IP Address - 25.34.12.56 , Mask - 255.255.0.0 , Network Address - 25.34.0.0

**5. What is subnetting? (Nov 11,15)**

The whole network can’t manage by single server, so that the entire network divided into small network in order to manage the network easily. Subnetting provides an elegantly simple way to reduce the total number of network numbers that are assigned.

The idea is to take a single IP network number and allocate the IP address with that network to several physical networks, which are now referred to as subnets.

**6. What is the function of a router? (Nov 10)**

Routers relay packets among multiple interconnected networks. They route packets from one network to any of a number of potential destination networks on internet. A router I termed as an intelligent device. Therefore, its capabilities are much more than those of repeater or a bridge. A router is useful for interconnecting two or more heterogeneous networks that differ in their physical characteristics such as frame size, transmission rates topologies, addressing etc. A router has to determine the best possible transmission path among several available paths. Destination, Cost and Next Hop are the important fields

**7. What is subnet mask?**

A subnet mask is a number that defines a range of IP addresses available within a network. A single subnet mask limits the number of valid IPs for a specific network. Multiple subnet masks can organize a single network into smaller networks (called subnetworks or subnets).

**8. Define CIDR?**

CIDR, which stands for Classless Inter-Domain Routing, is an IP addressing scheme that improves the allocation of IP addresses. It replaces the old system based on classes A, B, and C. This helped to extend the life of IPv4 as well as slow the growth of routing tables.

**9. How many network addresses and host addresses are supported by class A, class B networks?**

Class A: Number of networks = 127 Number of hosts = 224 -1

Class B: Number of networks = 214 -1 Number of hosts = 216 – 1 = 65,535

**10. What does a router do when it receives a packet with a destination address that it does not have an entry for, in its routing table?**

Default Router: If IP Software is not able to find the destination, from routing table then it sends the datagram to default router. It is useful when a site has small set of local address connected to it and connected to the rest of the Internet.

**UNIT-IV ROUTING**

PART-A

**1. Give any two Transportlayer service.(Dec 12)**

Multiplexing: Transport layer performs multiplexing/de-multiplexing function. Multiple applications employ same transport protocol, but use different port number.

According to lower layer n/w protocol, it does upward multiplexing or downward multiplexing.

Reliability: Error Control and Flow Control.

**2. Mention the various adaptive retransmission policy of TCP.**

* Simple average
* Exponential / weighted average
* Exponential RTT backoff
* Jacobson’s Algorithm

**3. How IANA has divided port numbers?**

IANA (Internet Assigned Number Authority) has divided port numbers into three ranges: 1)Well Known ports 2) Registered ports 3) Dynamic Ports.

**4. List few well known ports for UDP.**

Port Protocol Description

7 Echo Echoes a received datagram back to the sender

9 Discard Discards any datagram received

11 Users Active Users

13 Daytime Returns Date and Time

**5. Define congestion. (Nov 11)**

Congestion in a network occurs if user sends data into the network at a rate greater than that allowed by network resources. Any given node has a number of I/O ports attached to it. There are two buffers at each port. One to accept arriving packets & another one to hold packets that are waiting to depart. If packets arrive too fast node than to process them or faster than packets can be cleared from the outgoing buffers, then there will be no empty buffer. Thus causing congestion and traffic in the network.

**6. What is Tiny gram?**

A very small packet of data is called a tiny gram. Too many tiny grams can congest a network connection.

**7. Give the datagram format of UDP?**

The basic idea of UDP is for a source process to send a message to a port and for the destination process to receive the message from a port.

Source port address: It is the address of the application program that has created the message.

Destination port address: It is the address of the application program that will receive the message.

Total Length: It defines the total length of the user datagram in bytes.

Checksum: It is a 16 bit field used in error correction.

Source Port Address 16 bits Destination Port Address 16 bits

Total Length 16 bits Checksum 16 bits

**8. What is TCP? (Nov 11)**

Transmission Control Protocol provides Connection oriented and reliable services. TCP guarantees the reliable, in order delivery of a stream of bytes. It is a full-duplex protocol, meaning that each TCP connection supports a pair of byte streams, one flowing in each direction. It is used by FTP, SMTP.

**9. List out various congestion control techniques.**

1) AIMD (Additive Increase Multiplicative Decrease)

2) Slow start 3) Fast retransmit 4) Recovery

**10. What are the advantages of using UDP over TCP? (Nov 10)**

UDP is very useful for audio or video delivery which does not need acknowledgement.

It is useful in the transmission of multimedia data. Connection Establishment delay will occur in TCP.

**UNIT-V DATA LINK AND PHYSICAL LAYER**

PART-A

**1. Why do we need a Domain Name System? What role does the DNS Resolver play in the DNS system? (Nov 12)**

Domain Name System can map a name to an address and conversely an address to name. The Domain Name System converts domain names into IP numbers. IP numbers uniquely identify hosts on the Internet: however they are difficult to remember. We therefore need a memorable way of identifying hosts.

**2. What are the four main properties of HTTP?**

* Global Uniform Resource Identifier
* Request-response exchange
* Statelessness
* Resource metadata.

**3. What are 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. What is WWW and SMTP? (Nov 10,15)( May 15)**

* World Wide Web is an internet application that allows user to view pages and move from one web page to another.
* It helps to store and share data across varied distances. The TCP/IP protocol that 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.

**5. What are the four groups of HTTP Headers? What are the two methods of HTTP? (May 15) (Nov 15)**

The four groups of HTTP headers are

* General headers
* Entity Headers
* Request Headers
* Response Headers.

Two methods of HTTP are

GetMethod( ) PostMethod( )

**6. What is PGP? (Nov 10)(May 12)**

Pretty Good Privacy (PGP) is used to provide security for electronic mail. It provides authentication, confidentiality, data integrity, and non-repudiation. It is a program using public key encryption popularly used with email. Pretty Good Privacy uses a variation of the public key system. In this system, each user has an encryption key that is publicly known and a private key that is known only to that user. PGP comes in two public key versions -- Rivest-Shamir-Adleman (RSA) and Diffie-Hellman.

**7. What are the transmission modes of FTP? (Nov 21)**

* Stream mode: Default mode and data is delivered from FTP to TCP as a continuous stream of data.
* Block mode: Data is delivered from FTP to TCP in terms of blocks. Each data block follows the three byte header.
* Compressed mode: File is compressed before transmitting if size is big. Run length encoding method is used for compression.

**8. Why is an application such as POP needed for electronic messaging? (May 12)**

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. 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.

**9. What is the use of MIME Extension?**

Multipurpose Internet Mail Extensions (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. MIME converts binary files, executed files into text files. Then only it can be transmitted using SMTP.

**10. What is IMAP?**

Internet Message Access Protocol (IMAP) is a standard protocol for accessing e-mailfrom your local server. IMAP is a client/server protocol in which e-mail is received and held for you by your Internet server. MAP can be thought of as a remote file server. POP3 can be thought of as a "store-and-forward" service.