Subject-Computer Networks, M.Sc.(CS) - IIIrd Semester-2013

Max Marks -60

Section A

Note : Attempt all questions .All questions carry equal marks   10x2=20

1. Define frequency and period.
    Ans: Periods refers to amount of time in second ,a signal needs to complete one cycle
    Frequency refers to number of periods in one second.

2. Explain Time division multiplexing (TDM). How it is different form frequency division multiplexing (FDM).
   Ans: There are two different types of multiplexing as below :
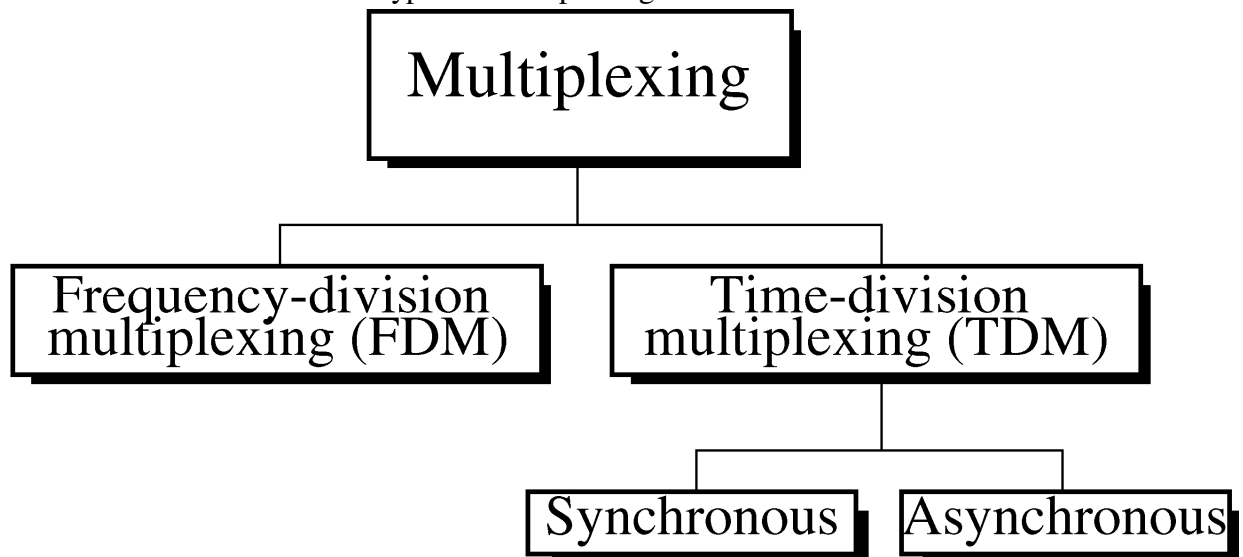
FDM : Is an analog technique that can be applied when the bandwidth of a link is greater than the combined bandwidth of a signal to be transmitted as shown in following figure.
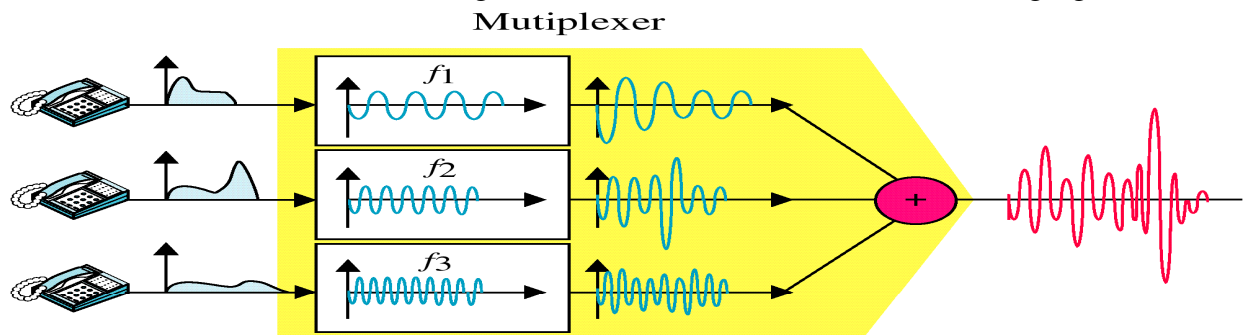
TDM : On the other hand TDM is digital process that can be applied when the data rate capacity of the transmission medium is greater than the data rate required by the sending and receiving devices as shown in following figure:

Multiplexer

AAAAAA

BBB

CCCC

DDDDD

A D A DC A DCBA DCBA DCBA
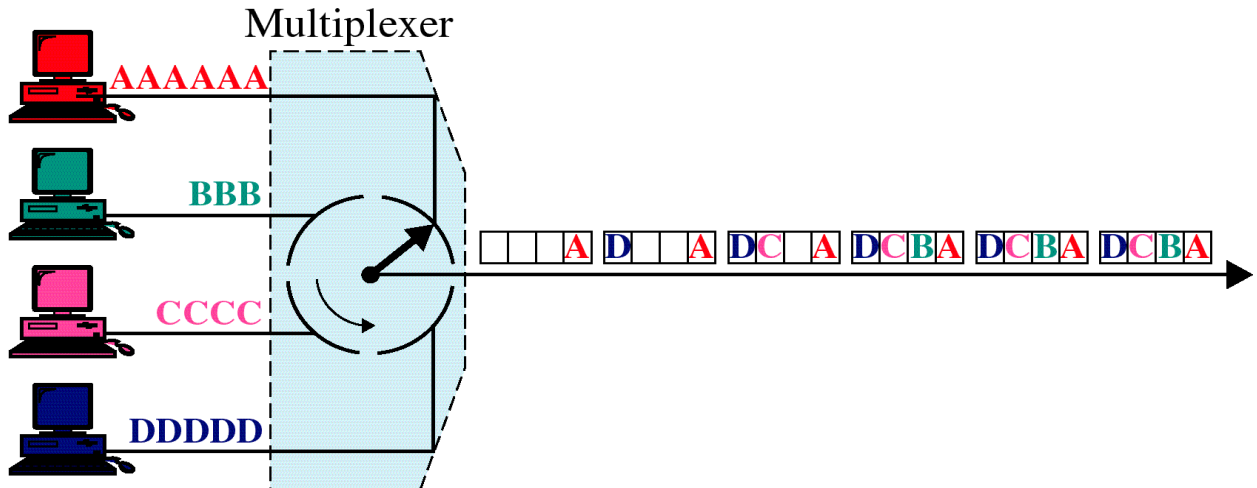
**3.** How many cross points are needed if we use a crossbar switch to connect 1000 telephones in a small town.

Ans :1000X1000 = 1000000 cross points will be required

4. What is the role of MAC sub layer of data link layer.

Ans: In any broadcast network, the stations must ensure that only one station transmits at a time on the shared communication channel.The protocol that determines who can transmit on a broadcast channel are called Medium Access Control (MAC) protocol.The MAC protocol are implemented in the MAC sublayer which is the lower sublayer of the data link layer

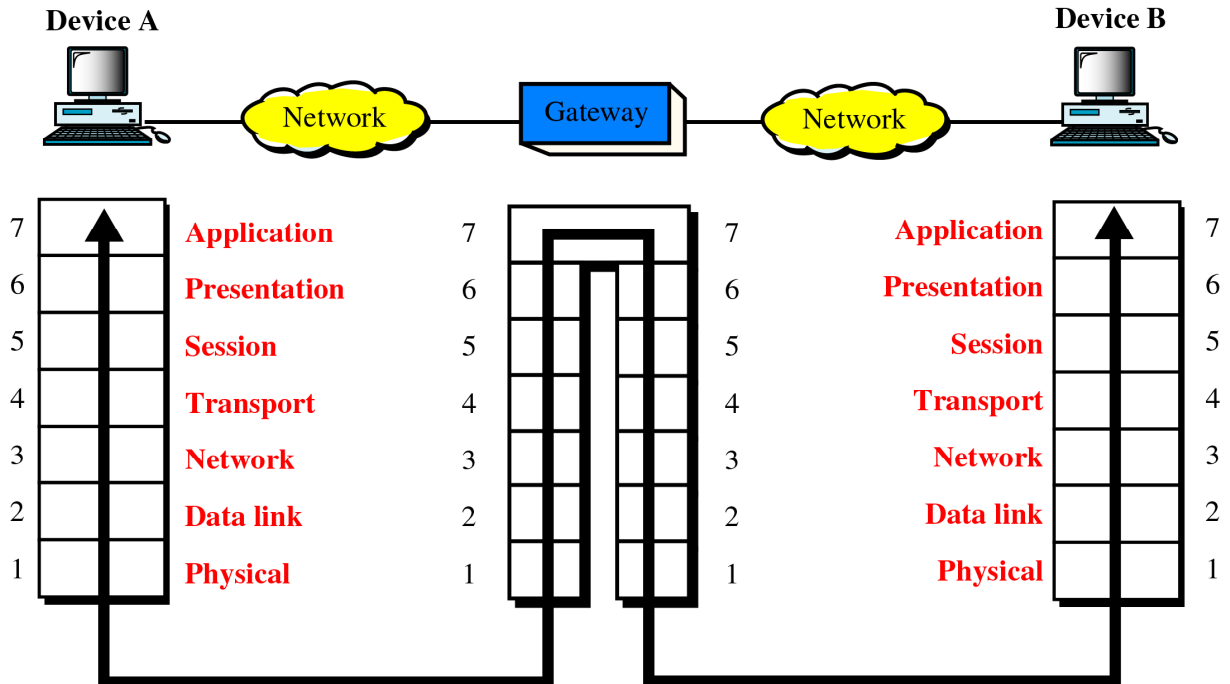**5.** Why hamming code is used.?

Ans: Hamming code is used for error correction using redundancy bits as shown in the following figure :

11	10	9	8	7	6	5	4	3	2	1
d	d	d	r	d	d	d	r	d	r	r

Redundancy bits
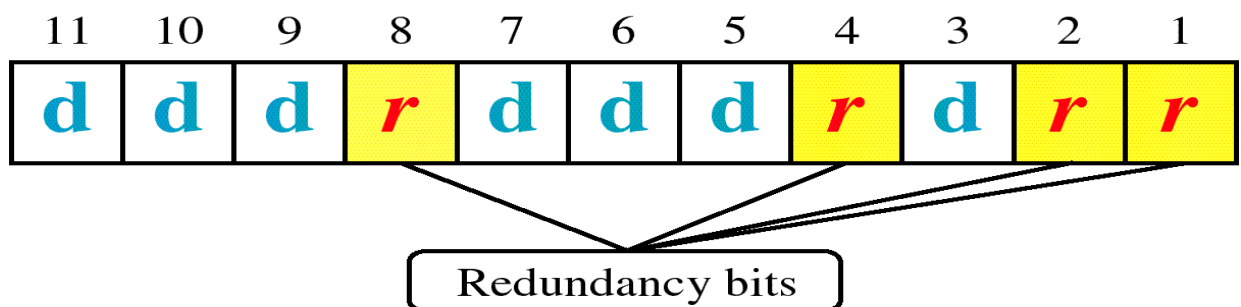
6. Explain the role of gateway.

Ans: Gateway potentially operates in all seven layers of the OSI model

Device A

Device B

Network   Gateway   Network

7		Application	7		7	Application		7
6		Presentation	6		6	Presentation		6
5		Session	5		5	Session		5
4		Transport	4		4	Transport		4
3		Network	3		3	Network		3
2		Data link	2		2	Data link		2
1		Physical	1		1	Physical		1

A gateway is software generally installed within router .Gateway understand the protocol used by each network linked into the router and is therefore able to translate from one to another.
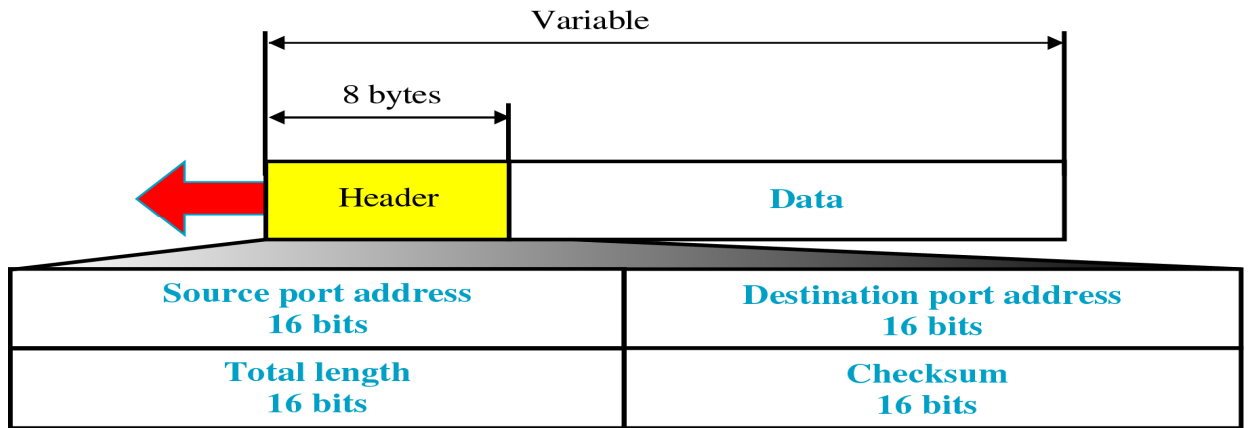
7. Explain different classes of IP address with range of IP address.

Ans: Classes of IP address and its range are as follow:

From   To

Class A   **0**.0.0.0   **127**.255.255.255
         Netid   Hostid   Netid   Hostid

Class B   **128**.0.0.0   **191**.255.255.255
         Netid   Hostid   Netid   Hostid

Class C   **192**.0.0.0   **223**.255.255.255
         Netid   Hostid   Netid   Hostid

Class D   **224**.0.0.0   **239**.255.255.255
         Group address   Group address

Class E   **240**.0.0.0   **255**.255.255.255
         Undefined   Undefined

8. Write the data format of user datagram protocol (UDP).

Ans: Data format of UDP is as follow:

Variable

8 bytes

Header	Data

Source port address 16 bits	Destination port address 16 bits
Total length 16 bits	Checksum 16 bits

9. Why is an application such as post office protocol (POP) needed for electronic messaging.

Ans: POP (Post office protocol) is used to download mail from the server .Working of POP3 is shown in the following figure .

Sending mail

Client   Server   Receiving mail

SMTP

Checking

Client   Downloading mail   Server

POP3

Desktop   Mail server   Internet
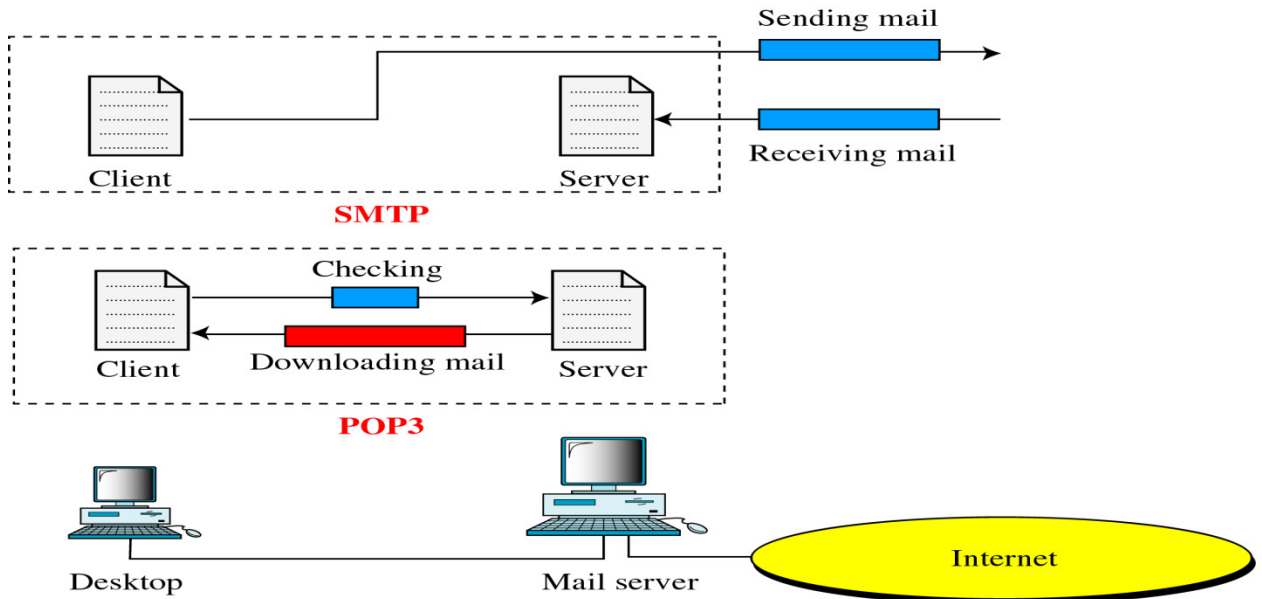
10. Why hash function is used in cryptography?

Ans: Hash function is used to create message digest of fixed length in order to provide integrity and authentication.

Explain in more detail

Section –B

Note: Attempt any four questions. All questions carry equal marks. 4X10=40

1. (a) Explain different IEEE standard of LAN.
    Ans: There are three well known protocols of LAN standardized by IEEE ,these are

a. CSMA/CD (802.3)
b. Token bus (802. 4)
c. Token ring (802.5)
   For more detail pl refer to PPT uploaded

(b) Explain different unguided media with one benefit and one drawback of each.

Ans: Unguided media transport electromagnetic waves without using a physical conductor. This type of communication is often referred to as wireless communication.

Following are the types of unguided media

Radio, Microwaves, Infrared

Radio: Radio waves are used for multicast communications, such as radio and television, and paging systems. They can penetrate through walls.Highly regulated. Use omni directional antennas.

Microwave: Microwaves are used for unicast communication such as cellular telephones, satellite networks,and wireless LANs.Higher frequency ranges cannot penetrate walls.

Use directional antennas - point to point line of sight communications.

Infrared : Infrared signals can be used for short-range communication in a closed area using line-of-sight propagation.

2. Differentiate Datagram approach with virtual circuit approach of packet switching.

   Ans: Both datagram approach and virtual circuit approach belongs to packet switching approach ,but they are different in many ways as shown in following figures

Data transfer
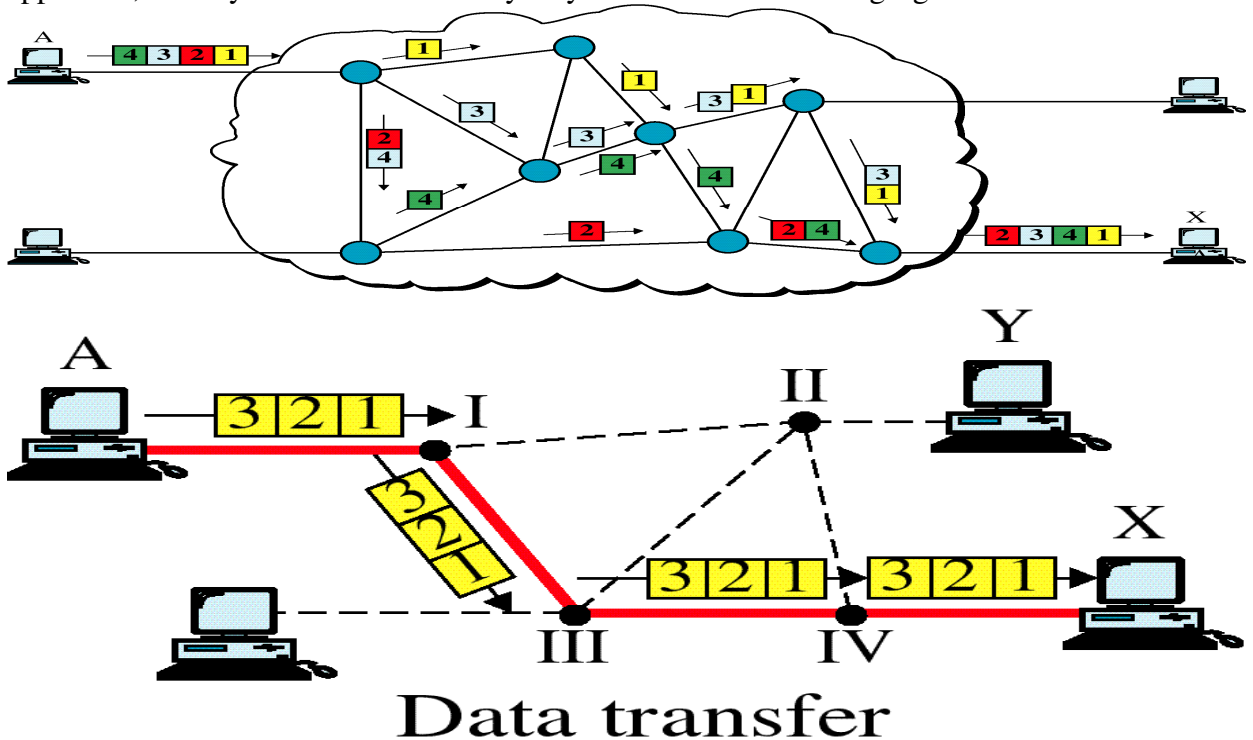
From the figure it is clear that in case of datagram approach ,need not to establish a dedicated path ,data belongs to same packet will travel in multiple paths while in case of virtual circuit switching a dedicated path (virtual) is must.
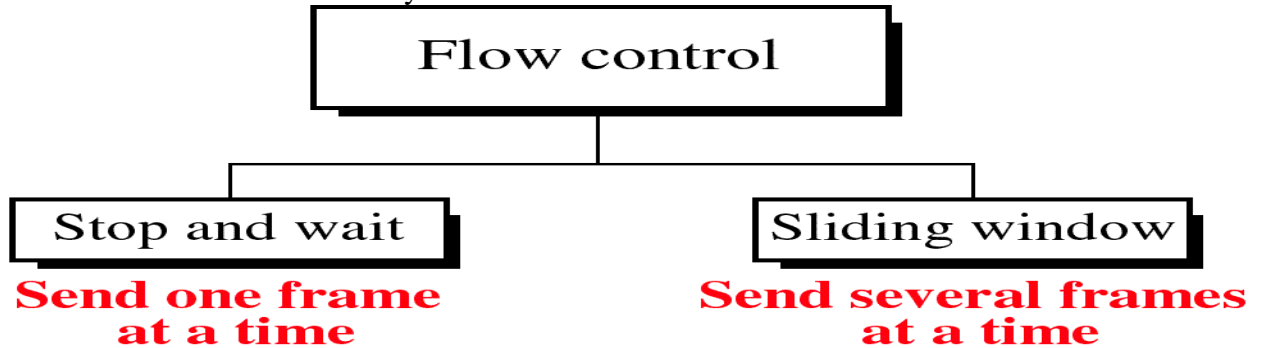
Other differences are explained in following table

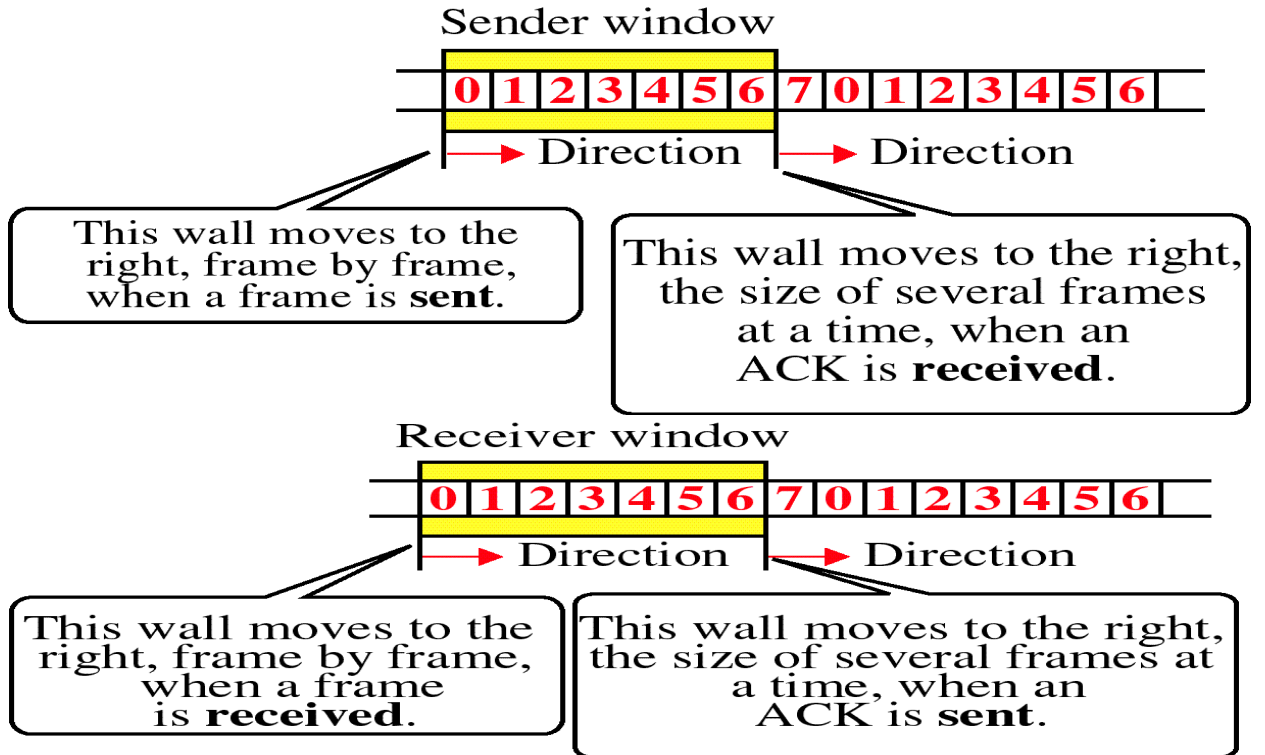| Issue	Datagram	Virtual circuit

|		
All packet follow the same route	No	Yes
Table look up	No	No
Connection establishment	No	Yes
Packet may arrive out of order	Yes	No

3. Explain sliding window protocol for flow control.

Ans: Two methods are basically used for flow control as below

Flow control

Stop and wait
Send one frame at a time

Sliding window
Send several frames at a time

A sender and receiver sliding windows works as follow

Sender window

0 1 2 3 4 5 6 7 0 1 2 3 4 5 6

→ Direction → Direction

This wall moves to the right, frame by frame, when a frame is **sent**.

This wall moves to the right, the size of several frames at a time, when an ACK is **received**.

Receiver window

0 1 2 3 4 5 6 7 0 1 2 3 4 5 6

→ Direction → Direction

This wall moves to the right, frame by frame, when a frame is **received**.

This wall moves to the right, the size of several frames at a time, when an ACK is **sent**.

Sending and receiving process in case of sliding widow protocol can be explained with the help of following figure

Sender

Receiver

Data 0
Data 1
ACK 2
Data 2
ACK 3
Data 3
Data 4
Data 5
ACK 6
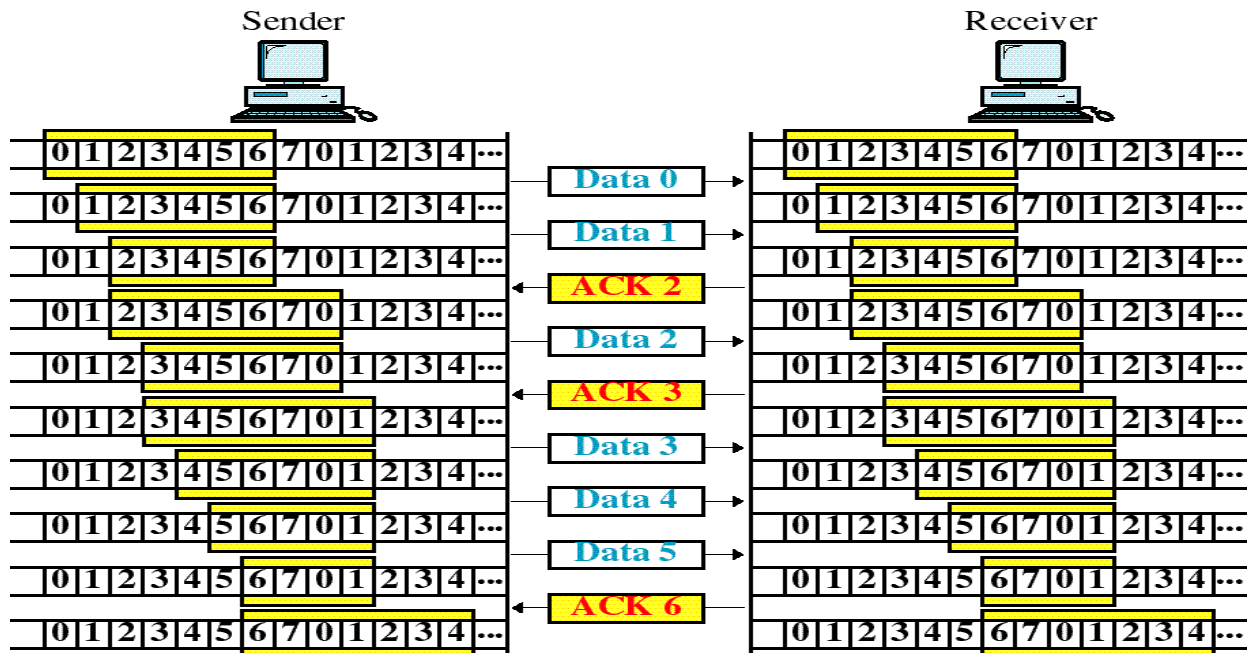
4. Find out checksum in case of following 16 bits of data to be sent
   10101001   00111001 Also verify the checksum for burst error.

Ans: Given data can be divided into two different segments of eight bits as below:

       10101001
       00111001

Sum   11100010

Checksum is compliment of the above 00011101

Data to be sent from the sender will be prepared by appending checksum for error detection as follow:

       10101001   00111001 00011101

One can calculate the above data for error detection with burst error and without error

5. Explain link state routing algorithm. A router using distance vector routing has the following routing table :

Network ID	Cost	Next Hop
Net2	6	A
Net3	4	E
Net4	3	A
Net6	2	D
Net7	1	B

The router receives following packet from router C

Network ID	Cost
Net2	4
Net3	5
Net4	2
Net6	3
Net7	2

Show the updated routing table for the router.

Ans: Advertised table is as below

Network ID	Cost
Net2	4
Net3	5
Net4	2
Net6	3
Net7	2

Adding one hop table will be

Network ID	Cost
Net2	5
Net3	6
Net4	3
Net6	4
Net7	3

Applying distance vector routing algorithm with this table and original table (Old) ,the updated table will be as below:

Network ID	Cost	Next Hop
Net2	5	C
Net3	4	E
Net4	3	A
Net6	2	D
Net7	1	B

6. Explain about TCP connection management and TCP timer management.
   Ans:TCP connection management consists following three activities
- **Opening a TCP Connection**
- **Closing a TCP Connection**
- **Special Scenarios**
- **State Diagram**
   TCP uses a **three-way handshake** to open a connection:
   (1) ACTIVE OPEN: Client sends a segment with
   – SYN bit set
   – port number of client
   – initial sequence number (ISN) of client
   (2) PASSIVE OPEN: Server responds with a segment with
   – SYN bit set
   – initial sequence number of server
   – ACK for ISN of client

(3) Client acknoedges by sending a segment with:

ACK ISN of server

TCP timer management: TCP uses the concept of timer management for retransmission of packets .

Of the several timers TCP maintains the most important is the retransmission timer RTO, (also called timeout) . After each segment is sent, TCP starts a retransmission timer, if ACK arrives before timer expires, cancel timer. If timer expires first,consider segment lowest. Other than these two following types of timer are also used

Persistent timer: Assume receiver advertises a window = 0. Sender stop sending. Receiver send segment with new window size. This segment is lost. Sender will keep waiting forever.

After getting a window of 0 the sender uses a persistent timer periodically to probe the receiver to send window advertisements. Once it gets a non-zero window the timer is stopped.

Keep alive timer: During long periods of inactivity, one side might send to the other a keep alive probe to check if the other side is alive.

7. (a) Explain concept of cryptography with its type.

Ans: Cryptography is the study of secret writing which consists about security ,authentication and integration etc for providing data security two very popular algorithms private key cryptography and public key cryptography are used .

Private key cryptography : Uses the concept of secrete key a single secrete key is used for encryption and decryption

Private key cryptography : A pair of key : public and private key is used ,this pair of key is generated by sender machine .Public key is shared by sender with receiver to encrypt the message while private key is used to decrypt the message.

(b) How http and html are related.

Ans:Http and html ,both are related to web .Http is protocol used to access the web while html is web page which is carried by the http ,we get html stream as an http response from the web server. Html is used to write code to design static web page .

Note: Answers of the questions are written in short ,students are advised to verify their answers also from PPT uploaded in our official website ggu.ac.in and the reference books .