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ct - 02

1. a) what do you mean by DCN? briefly 6

Describe about DCN. how many layers sub-layered DCN

(b) describe about functionality of data-link layer. 6

(c) what is logical link control and media access control? 2

2. (a) what do you mean by flow control. 7

types of mechanisms can be deployed to control the flow. briefly describe about

types of mechanisms to control the flow.

(b) briefly describe about Error control 7

requirements for error control mechanism.

3. (a) Describe about stop and wait ARQ 6
with diagram

(b) Describe about N -ARQ with necessary 3
figure.

(c) what is Data Link Layer

4. (a) Describe about selective Repeat ARQ 7
with proper diagram.

(b) Describe about error detection and 7
correction and also describe about
every type of error ?

5. (a) what do you mean by error detection 3
briefly describe about error detection,

(b) what do you mean by parity check 5

Describe about parity check, even parity

(c) what is error correction? types of error correction. describe about every type of error correction.

6. a. Describe about cyclic Redundancy check.

b. describe about layer-3 functionalities and network layer features

c. what do you mean by network layer 2
Describe briefly

7. a) what is application layer? explain 5
briefly.

(b) what do you mean by http? describe 6
briefly?

(c) what is FTP?

8. a) describe about application service 6

(b) what is network service. Describe 8

basic of computer network?

Ans to the que no - 01(a)

DCN: DCN means Data-link layer. Data link layer is second layer of OSI Layered model. This layer is one of the most complicated layers and has complex functionalities and capabilities. Data link layer hides the details of underlying hardware and represents itself to upper layers as the medium to communicate.

Data Link layer is responsible for converting data stream to signals bit by bit and send that over the underlying hardware. At the receiving end, Data link layer takes up data from hardware which are in the form of electrical signals.

Sub-layers of DCN:

- o Logical Link control.
- o media access control

Ans to the que no - 01(b)

Functionality of Data link layers:

- (1) Framing: Data link layer packets from network layer and encapsulates them into frames then it sends each frame bit by bit on hardware.
- (2) Addressing: Data-link layer provides layer-2 hardware addressing mechanism.
- (3) Synchronization: when data frames are sent on the link.

- (4) Error control: sometimes signals may have encountered problem in transmission and the bits are skipped.
- (5) Flow control: stations on same link may have different spend on capacity.
- (6) multi-access: when host on the shared link tries to transfer the data, it has a high probability of collision.

Ans to the que no 01(c)

Logical link control: it deals with protocols.

flow-control; and error control.

Media access control: it deals with actual

control of media.

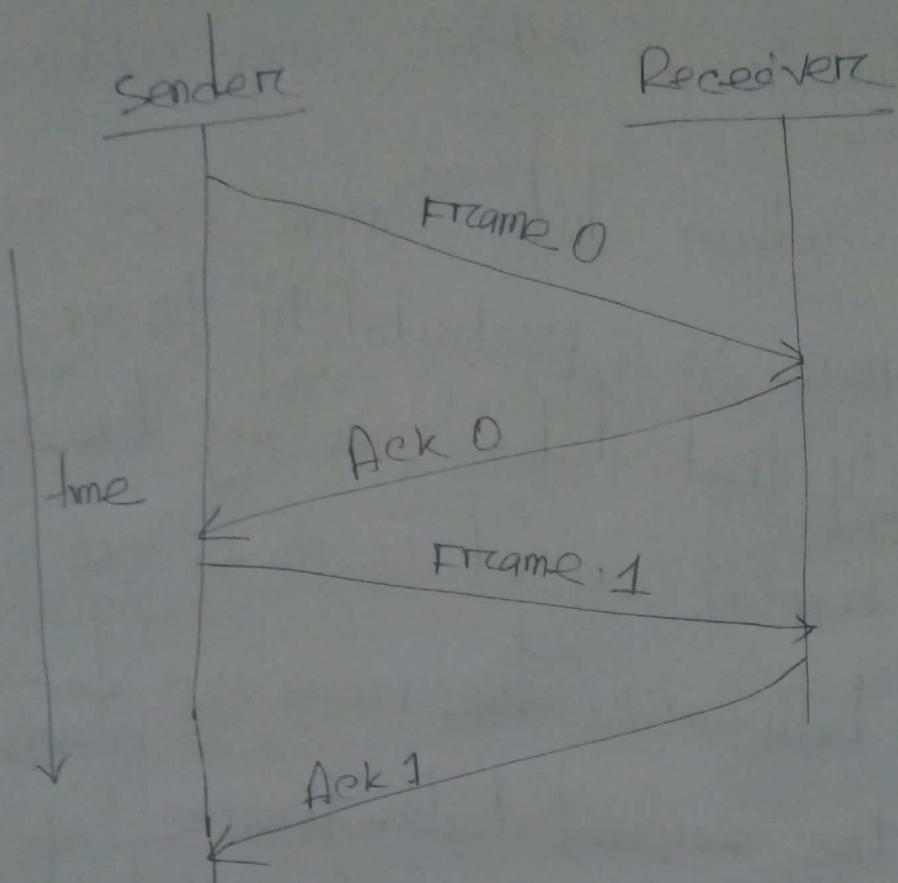
Ans to the que no-02(a)

Flow control: when a data frame is sent from one host to another over a signal medium, it is required that the sender and receiver should work at the same speed.

Two types of mechanism can be deployed to control the flow:

two types of mechanism can be deployed to control of the flow.

Stop and wait: the flow control mechanism forces the sender after transmitting a data frame to stop and wait until the acknowledgement of data-frame sent is received.



sliding window: in this flow control mechanism, both sender and receiver agree on the number of dataframes after which the acknowledgement should be sent. As we learnt, stop and wait flow control mechanism wastes resources.

Ans to the que no 2(b)

Error control: when data frame is transmitted, there is a probability that is a probability that data-frame may be lost in the transit or it is received corrupted, in both cases. The receiver does not receive the correct data-frame and sender does not know anything about any loss.

Requirements for error-control mechanism:

Error detection: The sender and receiver, either both or any, must ascertain that there is some error in the transit.

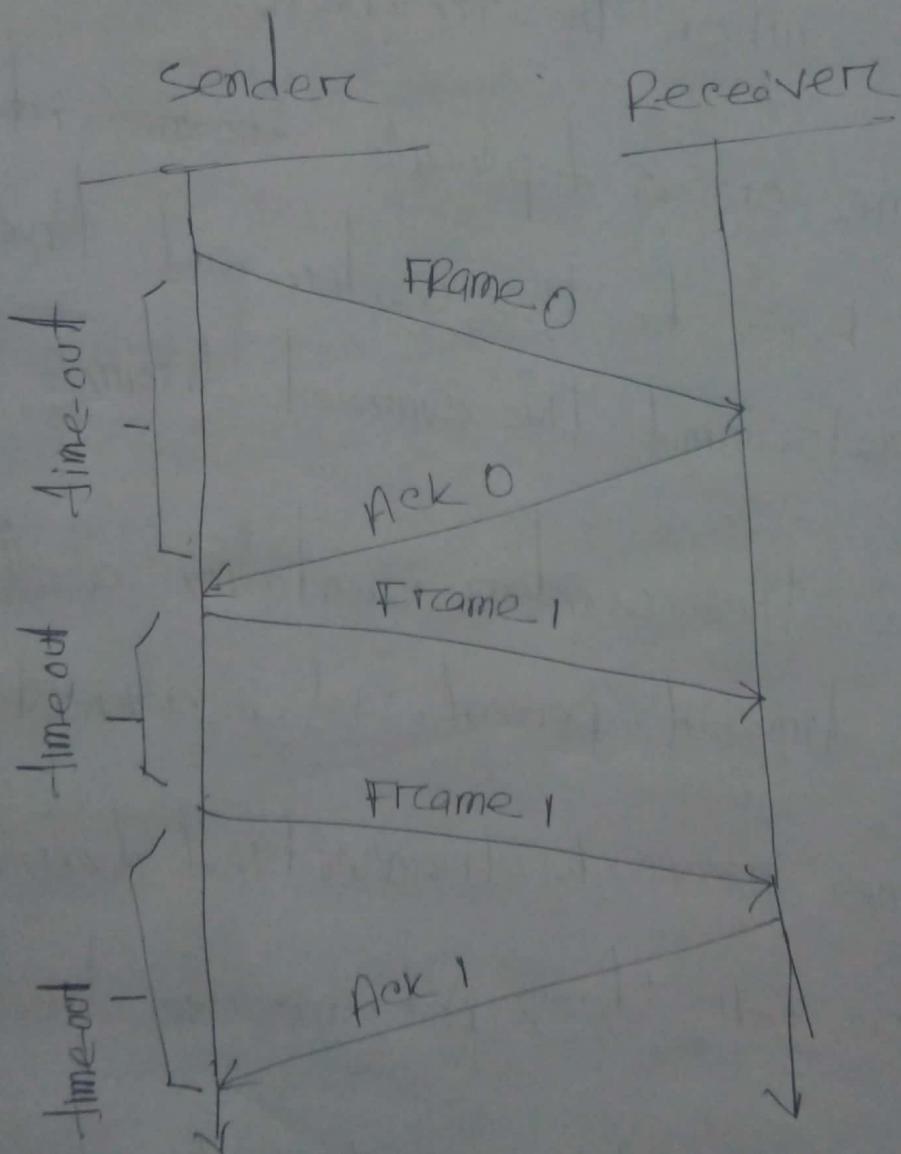
positive Ack: when the receiver, either both or any must ascertain that there is some error in transmit

Negative Ack: when the receiver receives a damaged frame or a duplicate frame, it sends a NACK back to the sender and the sender must retransmit the correct frame.

Retransmission: the sender maintains a clock and sets a timeout period. If an acknowledgement of data-frame previously transmitted does not arrive before sets does not arrive before timeout the frame thinking that the frame or the acknowledgement is lost in transit.

Ans to the que no 3(a)

stop-and-wait ARQ:



o the sender maintains a timeout counter.
o when a frame is sent, the sender starts the timeout counter.

o if acknowledgement of frame comes in time.

o if acknowledgement does not come in time

o if a negative acknowledgement is received.

Ans to the que no 3(b)

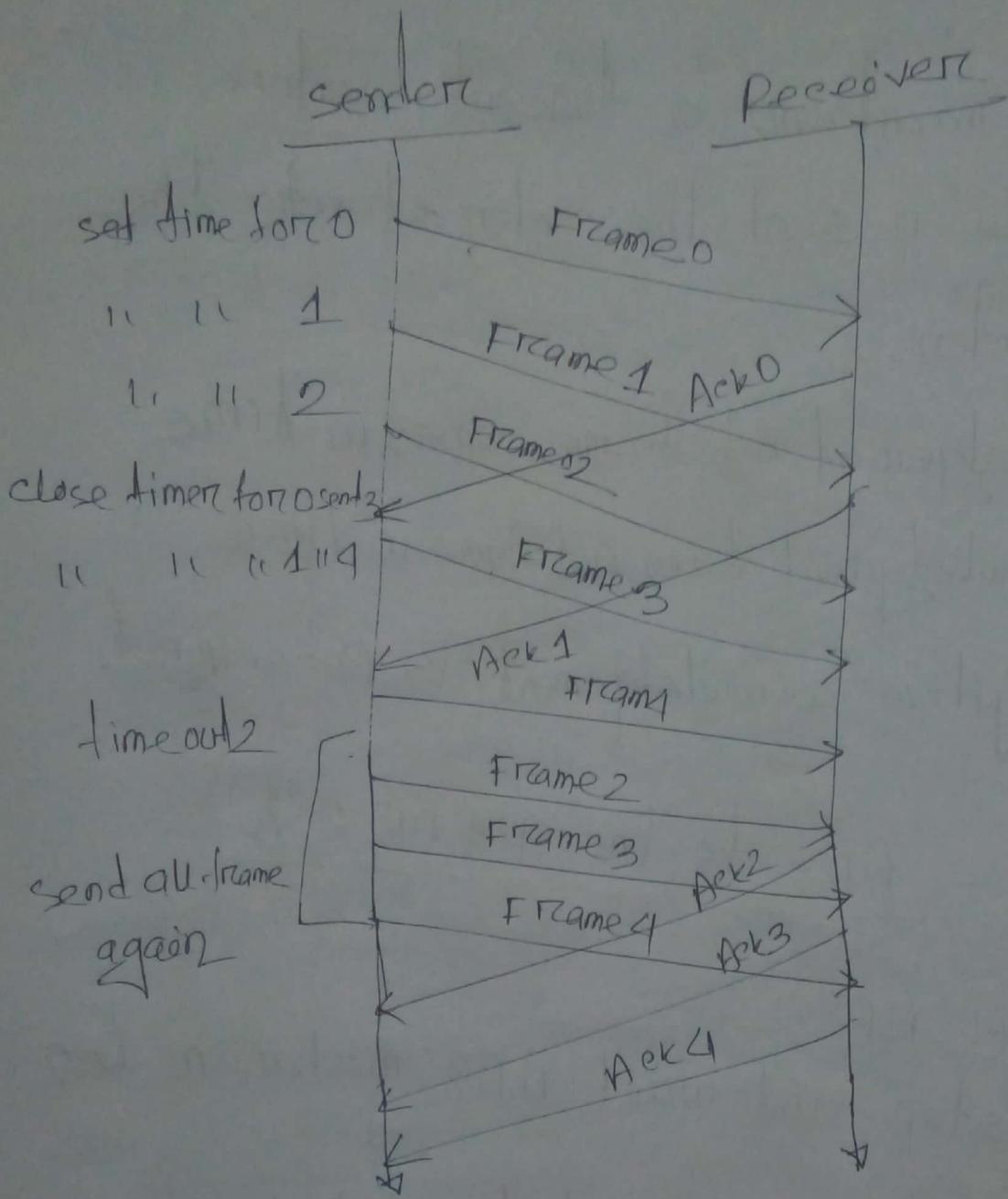
Go-back-N ARQ.

stop and wait ARQ mechanism does not utilize the resources at their best. when

acknowledgment is received the sender will

idle and does nothing. In Go-Back-N ARQ

method, both sender and receiver maintain a window



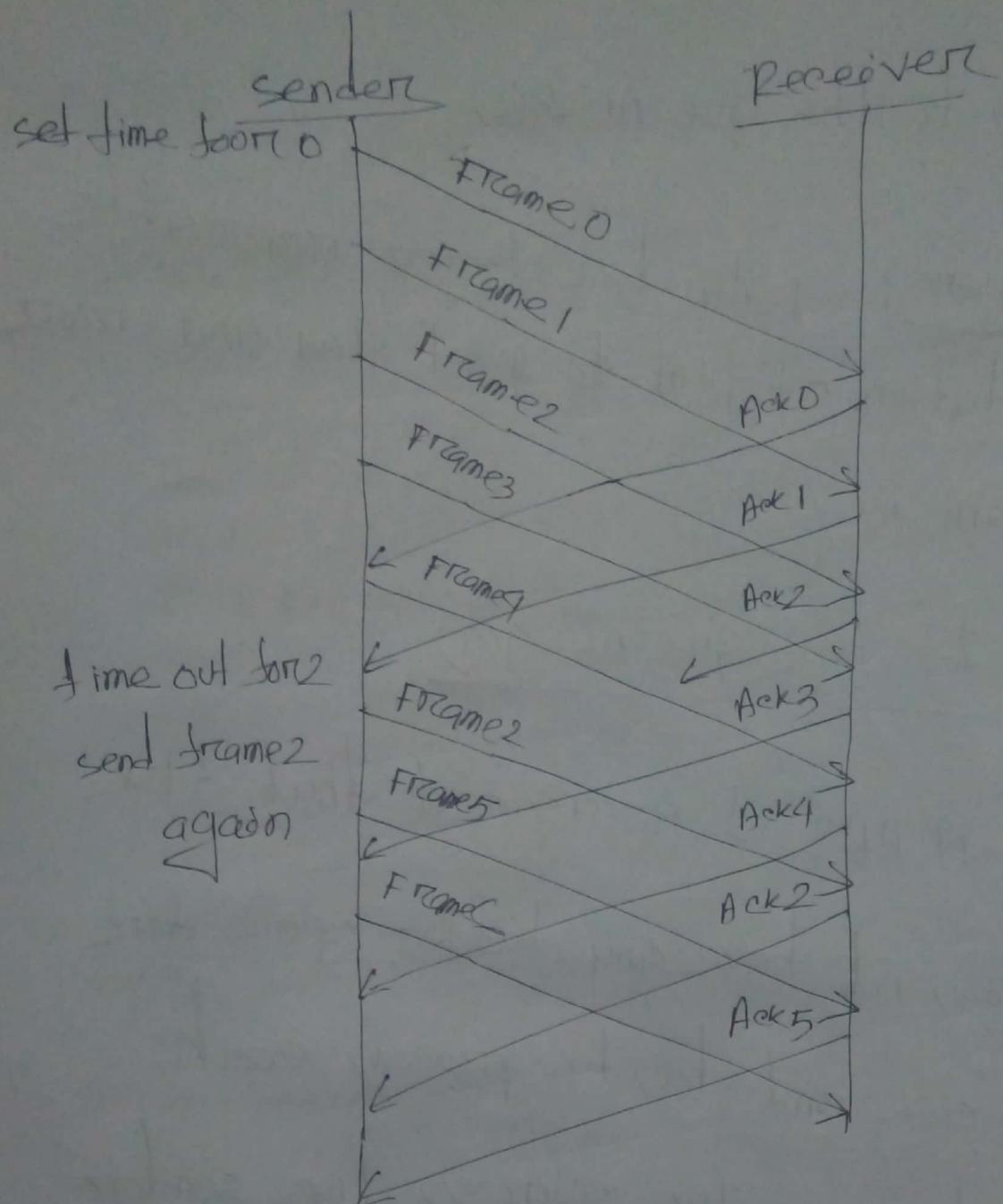
when the sender sends all the frames in window. it checks up to what sequence number it has received

Ans to the que no 3(c)

Data Link Layer: Data Link Layer responsible for implementation of point to point flow and error control mechanism.

Ans to the que no 4(a)

in Go-back-N ARQ it is assumed that the receiver does not have any buffer space for its window size and has to process each frame as it comes this enforces the sender to retransmit all the frames which are not acknowledged.



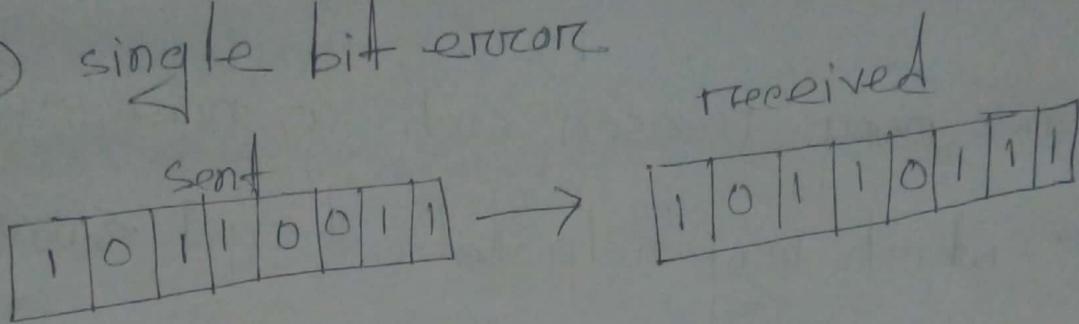
in selective-repeat ARQ, the receiver while keeping track of sequence numbers, buffers the frame in memory and sends NACK for only frame which is missing or damaged.

Ans to the que no 4(b)

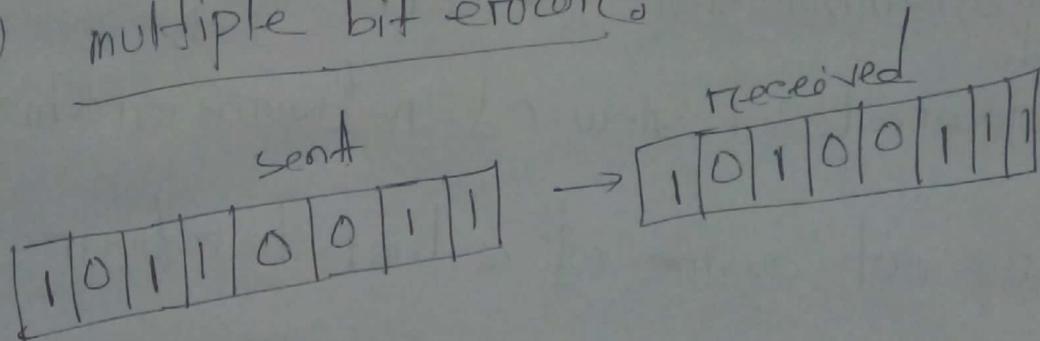
There are many reason such as noise, cross talk etc which may help data to get corrupted during transmission. The upper layers work on some generalized view of network architecture and are not aware of actual hardware data processing. Hence, the upper layers expect error-free transmission between the systems. Most of the applications would not function expectedly if they received erroneous data. Applications such as voice and video may not be affected and with some errors they may still function well.

types of errors:

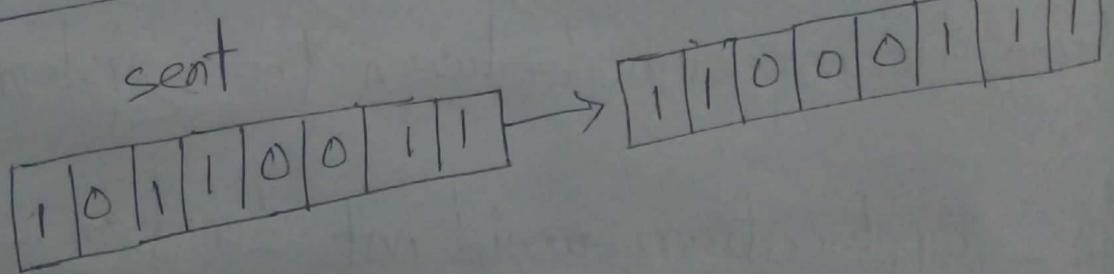
(1) single bit errors



(2) multiple bit errors



(3) Burst errors:



Am to the que no 5(a)

Error detection:

Error in the received

frame are detected by means of parity

check and cyclic redundancy check (CRC). In

both cases, few extra bits are sent along with actual data to confirm that bits received

at other end are same as they were sent. If

The counter-check at receiver end fails, the

bits are considered corrupted.

Aim to the que no 5(b)

Parity check: One extra bit is sent along

with the original bits to make number of 1s

- either even in case of even parity, or odd
in case of odd parity.

The sender while creating a frame

where retransmitting is not expensive. for
example, fiber optics. But in case of wireless
transmission retransmitting may cost too much.
in the latter case, forward error correction
is used.

for m data bits n redundant bits are
used. n bits can provide 2^n combinations
of information

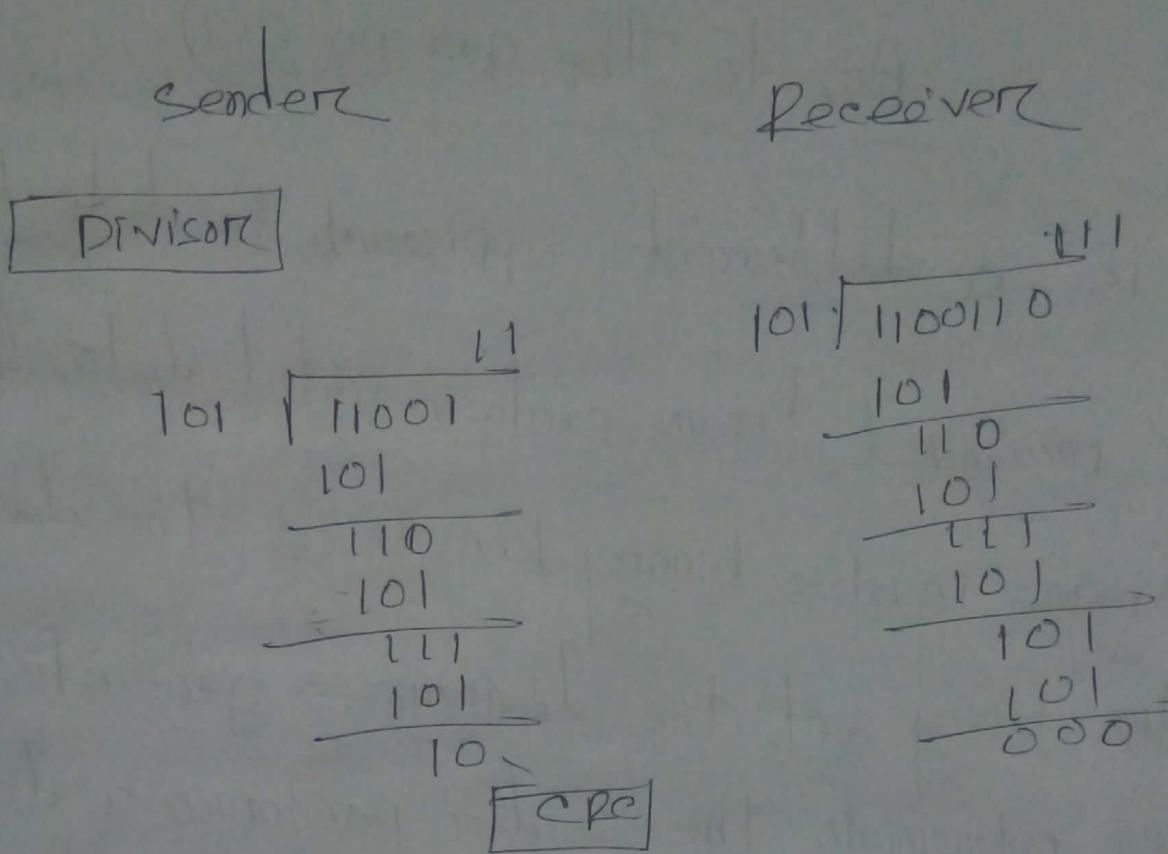
In m+n bit code word.

$$2^m \geq m+1$$

so the number of n bits used must
inform about m+n bit locations plus no-
error information m+n+1

Ans to the que no 6(a)

crc is a different approach to detect if
The received frame contains valid data. This
technique involves binary division of the data
bits being sent. The divisor is generated
using polynomials. The sender performs a division
operation on the bits being send and calculate
the remainder. before sending the actual
bits. the sender adds the remainder at
the end of the actual bits. Actual data
bits plus the remainder. then sender trans-
mits data bits as codeword.



At the other end, the receiver performs division operation on codewords using the same CRC divisor. If the remainder contains all zero the data bits are accepted, otherwise it is considered as there some data corruption occurred in transit.

Aim to the que no 6(b)

Layer-3 Functionalities :-

Devices which work on network layer mainly focus on routing. Routing may include various tasks aimed to achieve a single goal.

- (1) addressing device and networks
- (2) populating routing tables on static routers
- (3) queuing incoming and outgoing data and then forwarding them according to quality of service constraints set for those packets
- (4) internetworking between two different subnets
- (5) delivering packets to destination with best effort

Network layer feature:

Layer 3 can provide various features as

- (1) Quality of service management.
- (2) Load balancing and link management.
- (3) security.
- (4) Interrelation of different protocols and subnets with different schema
- (5) Different logical network design over

The physical network design.

Ans to the que no 6(c)

Network layer: Layer-3 in the OSI model

is called network layer. Network layer manager options pertaining to host and network addressing managing sub networks, and internetworking.

Ans to the que no 7(a)

application layer: application layer is the top most layer in OSI and TCP/IP layered model. This layer exists in both layered models because of its significance and user application.

A user may or may not directly interact with the application

- Application layer is where the actual communication is initiated and concluded.
Because this layer is on the top of the layer stack it does not serve any other layers.
when an application layer protocol wants to communicate with another protocol on application layer protocol on remote host it hands over the data or information to the transport layer. the transport layer does not do the rest. with the help of all the layers.

Aim to The que no 7(b)

HTTP HTTP means hyper text transfer protocol is the foundation of world wide web. Hyper text is well organized documentation system which uses hyperlinks to link the pages in the text documents. HTTP works on client server model. When a user wants to access any HTTP page on the internet, the client machine at user end initiates a TCP connection to server on port 80. When the server accepts the client request, the client authorized to access web pages.

To access web pages, a client

normally user web browsers, who are responsible for initiating, maintaining and closing tcp connection. HTTP is stateless protocol, which means the server maintains no information about earlier requests by client.

(i) HTTP 1.0 uses non persistent HTTP.

At most one object can be sent over a single tcp connection.

(ii) HTTP 1.1 uses persistent HTTP.

In this version, multiple objects can be sent over a single tcp connection.

Ans to the que no 7(c)

FTP: Ftp means file transfer protocol.
FTP is the most widely used protocol for file transfer over the network. FTP uses TCP/IP for communication and it works on TCP port 21. FTP works on client/server model where a client requests file from server and server send requested resource back to the client.

FTP user out-of-band controlling \hookrightarrow FTP user TCP port 20 for exchanging controlling information and the actual data is sent over TCP port 21.

Aim to the que no 8(a)

Application services: There are nothing but providing network based services to the users such as web services, database managing, and resource sharing.

Resource sharing: to use resources efficiently and economically, network providers a mean to share them. This may include servers, providers etc.

Databases: This application service is one of the most important service. it stores data and information, process it and enables the user to

retrieve it efficiently by using queries.

web services: world wide web has

become the synonym for internet it is used to connect to the internet, and access files and information servers provided by internet servers.

Ans to the que no 8(b)

Network services: computer system and

computerized systems help human beings

to work efficiently and explore the

unthinkable. when these devices are

connected together to form a network,

the capabilities are enhanced multiple times.

computer network service:

Directory Services: These services
are mapping between name and value
which can be variable value or
fixed, and provides various means
of accessing it.

- (i) Accounting.
- (ii) Authentication and Authorization.
- (iii) Domain name service.

File services: File services include
sharing and transferring files over
the network.

(i) File sharing: one of the reason which gave birth to networking was file sharing. File sharing enables the users to share their data with other users.

(ii) file transfer: This is an activity to copy or move file from one computer to another computer or to multiple computers with help of underlying network.

communication services:

- (i) Email.
- (ii) social networking.
- (iii) internet chat.
- (iv) discussion boards.
- (v) Remote access.

Application services: These are nothing

but providing network based services

to the user such as web services

database managing and resource sharing

(i) for resource sharing.

(ii) databases

(iii) web services.