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IT-18031

Question and Answer

- 1) (a) Define Transport layer and its function  
(b) Explain end-to-end communication in transport layer.  
(c) How. crush recovery form in TCP?

Ans to the que no - 1(a)

Transport Layer :- Transport layer offers peer-to-peer and end-to-end connection between two processes on remote hosts.

Functions :-

- (i) This layer is the first one, which breaks the information data.
- (ii) This layer ensures that data must be received in the same sequence.
- (iii) This layer provides end-to-end delivery of data between hosts.

(iv) All server processes intend to communicate over the network are equipped with well-known Transport.

Ans to the que no - 1 (b)

Answer:- A process on one host identifies

its peer host on remote network by means to TSAPs. also known as Port Numbers. TSAPs are very well defined a process which is trying to communicate with its peer knows this in advance.

The two main transport layer protocols are :-

- (i) Transmission Control protocol
- (ii) User Datagram protocol

When a DNS client wants to communicate with remote DNS server. It always request to give the best.

Ans to the que no - 1(c)

Answer:- The transmission Protocol (TCP) is one of the most important protocols of Internet protocols suite.

Features of TCP:-

- (i) TCP provides error-checking and recovery mechanism.
- (ii) It provides end-to-end communication.
- (iii) It provides flow control and service quality.
- (iv) Operates in client/server point-to-point mode.
- (v) It can perform both receiver and sender.

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Question No-02

- 2) (a) what is Hamming distance?  
what is the minimum hamming  
distance.
- (b) what is framing? Discuss the  
concept of redundancy in error  
detection and correction.
- (c) What kinds of arithmetic is  
used in checksum calculations?

Ans to the que no-2 (a)

Answer :-

Hamming Distance & The hamming distance  
between two words is the numbers of  
differences between corresponding  
bits. we show the hamming distance  
between two words  $X$  and  $Y$  as  
 $d(X, Y)$

Minimum Hamming Distance Although the concepts of the hamming distance is the central point on the dealing with error detection and correction codes. The measurement that is used for designing a code is the minimum Hamming distance. In a set of words, the minimum Hamming distance is the smallest hamming distance between all possible pairs. we used min to define the minimum hamming distance in a coding scheme. To find this value, we find the Hamming distances between all words & select the smallest one.

b

Ans to the que no.- 2 (b)

Framing:- Data-link layer takes packets from network layer and encapsulates them into frames. Then, it sends each frame bit-by-bit on the hardware. At receiver end, data link layer picks up signals from hardware and assembles them into frames.

Redundancy in error detection and correction

One's complement arithmetic is used to add data item in checksum calculation.

In this arithmetic when a number needs more than  $n$  bits the extra bits are wrapped and added to the number. In this arithmetic the complement of a number is made

by inverting all bits. The checksum is used in the internet by several protocols although not at the data link layer.

Ans to the que no - 2(c)

Arithmetric used in checksum calculation :-

One's complement is used to add data item in checksum calculation. In this arithmetic when a number needs more than n bits the extra bits are wrapped and added to the number. In this arithmetic that complement of a number is made by inverting all bits.

The checksum is used in the internet by several protocols although not at the data link layer. Like linear and

yclic codes, the checksum is based on the concepts of redundancy; several protocols still used the checksum for error detection.

### Question no-03

- 31 (a) What is switching?
- (b) Briefly explain different types of switching.
- (c) How to convert analog signals into digital signals? Explain with example.

### Ans to the que no- 3(a)

Switching: Switching is process to forward packets coming in forms one part to a part leading towards the destination. When data comes on a part it is called ingress, and when data

leaves a port it is called ingress, when data leaves a port or goes out it is called egress. A communication system may include number of switches and nodes. At broad level, switching can be divided into two major categories:

(i) connectionless:- The data is forwarded on behalf of forwarding tables. No previous handshaking is required and acknowledge are equal.

(ii) connection Oriented:- Before switching data to be forwarded to destination, there area is a need to pre-establish circuit analog the path between both endpoints.

Ans to the que no-3(b)

Answer :- write down the different types of switching :-

(i) Circuit switching :- When two nodes communicate with each other over a dedicated communication path, it is called circuit switching, to transfer the data circuit must be established so that the data transfer can take place.

(ii) Message switching :- In message switching, the whole message is treated as a data unit and is switching/transferred in its entirety. This technique was considered substitute to circuit switching the whole path is blocked for two entities only. Message switching is replaced by packet switching.

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(iii) Packet switching: shortcoming of message switching gave birth to an idea of packet switching. The entire message is broken down into smaller chunks called packets. The switching information is added in the header of each packet and transmitted independently.

Ans to the que no - 3(e)

Answer- Analog to digital conversion microphones create analog voice and cameras creates analog videos which are treated as analog data, over digital signals, we need analog to digital conversion. Analog data is a continuous stream of data in the wave form whereas digital data is discrete. To convert analog wave into digital data, we use pulse Code Modulation (PCM). PCM is one of the most commonly used method to convert

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analog data into digital form. Its involve three steps, such as

- (i) Sampling
- (ii) Quantization
- (iii) Encoding.

#### Question No-04

- 41 (a) with suitable example describe the error detection method : cyclic Redundancy check.
- (b) Explain the case of operations of stop-wait ARQ with necessary diagram.
- (c) Explain briefly error detection.

#### Ams to the que no - 4 (a)

#### Answer :-

cyclic Redundancy check :- CRC is a

different approach to detect if the received frame contains valid data. This techniques involves binary division of the data bits begin sent.

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The divisor is generated using polynomials. The sender performs a division operation on bits being sent, and calculates the remainder. Before sending the actual bits, the sender adds the remainder, at the end of actual bits. Actual data bits plus the remainder is called a code word. The sender transmits data bits as code words.

<p>Divisor</p> $\rightarrow 101 \overline{)110010}$ <p style="margin-left: 100px;">↑ 4 Data bits</p> $  \begin{array}{r}  11 \\  101 \\  \hline  110 \\  101 \\  \hline  111 \\  101 \\  \hline  10 \\  \end{array}  $ <p style="text-align: center;">↑ CRC</p>	<p>Divisor</p> $\rightarrow 101 \overline{)11001104}$ <p style="margin-left: 100px;">↑ data bits + CRC</p> $  \begin{array}{r}  111 \\  101 \\  \hline  110 \\  101 \\  \hline  111 \\  101 \\  \hline  101 \\  101 \\  \hline  000 \\  \end{array}  $ <p style="text-align: center;">→ NO ERROR</p>
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At the other end, the receiver performs division operations on codewords using the same error-divisor.

Ans to the que no - 4 (b)Answer :-

case of operations of stop-and-wait

ARQ :-

- i) The sender maintains a timeat counter.
- ii) when a frame is sent, the sender starts the timeout counter.
- iii) If acknowledgement of frame comes in time, the sender transmit the next frame in queue.
- iv) If acknowledgement does not come in time, the sender assumes that either the frame or its acknowledgement is lost in transmit. sender retransmits the frame and start the timeout counter.
- v) If a negative acknowledgment is received, the sender retransmits the frame.

### Ans to the que no - 4(e)

Answer:- Error correction can be done in two ways in the digital world.

i) Backward Error correction- when the receiver detects an error in the data received, it request back the sender to retransmit the data unit. Backward Error correction, is simple and can be efficiently used where retransmit is not expensive. For example, Fiber optics.

ii) Forward Error correction- when the receiver detects some error in the data received, it executes error-correcting code, which helps it to auto-recover and to correct some kinds of corner. But in case of wireless transmission retransmitting may cost too much.

### Question NO-05

- what are routing algorithms?
- what is unicast routing? Explain.
- what is broadcast routing?

#### Ans to the que no-5(a)

Answer:- The routing algorithms are:-

(i) Flooding:- Flooding is a simplest method of packet forwarding. When a packet received, the routers send it to all the interfaces except the one which it was received. TTL can be used to avoid infinite looping of packets.

(ii) shortest Path:- Routing decision in networks are mostly taken on the basis of cost between source and destination.

common shortest path algorithms are

1) Dijksktra's Algorithm

2) Belman-Ford Algorithm

Ans to the que no - 5 (b)

Answers :- Most of the traffic on the internet

and intra-nets known as unicast data  
on unicast traffic is sent with specified  
destination. Routing unicast data over

the internet is called unicast routing.

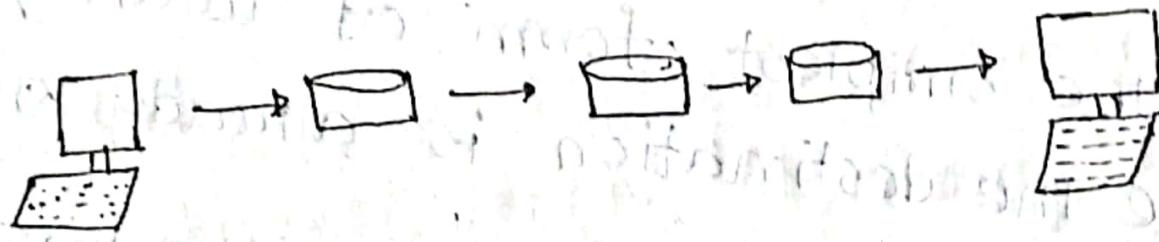
It is the simplest form of routing  
because the destination is already known.

Hence the router just ~~as~~ has  
to look up the routing table and

forward the packet to next hop.

### Ans to the que no-5(c)

Answer:- By default, the broadcast packets are not routed and forwarded by the routers on any network. Routers creates broadcast domains. But it can be configured to forward broadcast in some special cases.



Source

Destination

A broadcast message is detained to all network devices.

Question NO-6

- (a) what is tunneling?
- (b) Explain packet fragmentation.
- (c) what does Internet Protocol version (IPV4) mean? explain.

Ans to the que no-6(a)

Answer- Tunneling is a mechanism by which two or more some networks communicate with each other, by passing intermediate networking complexities. Tunneling is configured at both ends.

When the data enters from one end of tunnel. it is tagged. This tagged data is then routed inside the intermediate or far transmit network to reach

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the other end of Tunnel. When data exists the tunnel its tag is removed and delivered to the other part of the network.

Ans to the que no - 6 (b)

Answer:- Most ethernet segments have their maximum transmission unit (MTU) fixed to 1500 bytes. A data packet can have more or less packet length depending upon the application. Devices in the transmission handle and that size of packet it can process. If the data packet size is less than or equal to the size of packet the transmission network can handle it is proceed

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netrally, if the packet is larger it is broken into smaller pieces then forwarded. This is called packet fragmentation.

Ans to the que no-6(c)

Answer - Internet Protocol Version (IPv4) 4 is the fourth revision of the Internet Protocol and widely used protocol in data communication over different kinds of networks. IPv4 is connectionless protocols used in packet-switched layer networks, such as Ethernet. It provides the logical connection between network devices including manual and automatic configurations - depending on the network type.

IP addresses are divided into many categories:-

class-A- It uses first octet for network addresses and last three octets for host addressing.

class-B- It uses two octets for networking addresses and last two for host addressing.

class-C- It uses first three octets for network addresses and last one for host.

Question NO - 07

- (a) Define Network Routing?
- (b) Explain different types of Routing?
- (c) Explain different Routing Protocols.

Ans to the que no - 07 (a)

Answer :- when a device has a multiple paths for reach to destination, it always selects one path by preferring it over others. This selection process is termed as routing. Routing is done by special network devices called routers or it can be done by means of software process. A router is always configured and some default route. A default route tells the router where to forward a

2A packet if there is no route found for specific destination.

Ans to the que no - 7(b)

Different types of routing is given below:

Unicast Routing :- Most of the traffic on the internet and intra-nets known as unicast data or unicast traffic is sent with destination.

Broadcast Routing :- Routers create broadcast domains. A broadcast message is destination to all network devices.

Anycast Routing :- Anycast packet forwarding is a mechanism where multiple hosts can have some logical address. DNS provide the IP address which is the nearest IP configured on it.

Ans to the que no - 7(e)

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Answer :-

Unicast Routing Protocols :- Distance Vector

Routing protocols vector is simple routing decision. Link state routing protocol is slightly complicated protocol than Distance vector.

Multicast Routing Protocol :- Multicast Routing

protocols use trees i.e. spanning tree to avoid loops. The optimal tree is called shortest paths spanning tree, DVMRP, MOSPF, CBT, PIM, PIM Dense mode and PIM Sparse mode. This all are also works multicast Routing protocols.

Question No-08

- (a) Define networking and explain examples of network devices.
- (b) Explain Network topologies and types of Network.
- (c) what are requirements and features of UDP?

Ans to the que no-08(a)

Answer:- A network is a collection of computers, servers, mainframes, network devices and other devices connected to one another to allow the sharing of data. Internet is now available by the help of network alone.

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examples :- Desktop, computers, Laptops, mainframes, Firewalls, Bridges, Repeaters etc.

Ans to the que no - 8(b)

Answer :- The term network topologies describes the relationship of connected devices in terms of geometric graph. Devices are represented as vertices and their connections are represented as edges on the origin. It describes how many connections each device has, in what order, and in what sort of hierarchy. Typical network configuration include the bus topology, mesh Topology, ring topology and bridge Topology.

Ans to the que no - 8 (e)

we deploy TCP-UDP where the acknowledgement packets share significant amount of bandwidth along with the actual data.

Features :-

- (i) UDP is good protocol for data flowing.
- (ii) It is simple and suitable for Query.
- (iii) It is not connected Oriented.
- (iv) It is stateless.
- (v) It is suitable protocol for streaming.
- (vi) It is used when data doesn't hold anything significance.