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Submitted by
Md. Md Sohanur Islam
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Submitted to
Nazrul Islam
AssistantProfessor,
Department of ICT,MBSTU
Santosh,Tangail-1902

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(a) What are the concerns of physical layer in internet model ? ②

(b) What are the purpose of multiplexing? Why do you need switching in data communication. ⑥

(c) How does transmission media affect a network ? What is the purpose of transmission media ?. ⑥

Question : 2

(a) What is the role of carcarierz signal in abalog transmission ? Which chip used in analog to digital.

(b) Why do you need digital to analog converzeion ? Is wifi analog or digital.

(c) What is wired transmission media? what is the difference between coaxial cable and twisted pair cable.

Question: 3

(a) What happens to light when it is transmitted.? ③

(b) What is the difference between frequency division multiplexing and time division multiplexing ⑥

(c) What layers does a switching circuit take place ? Is managed switch a router? (3+2)

Question : 4

(a) What is the role of transport layer? ⑤

(b) What are the design issues of transport layer? which devices uses transport layer? ⑤

(c) What is used to set up end to end communication that takes place between host? Does not provide reliable end to end communication.? ④

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ⓑ How does a radio signal created? How do radio waves go through walls ⑤

ⓒ Why microwave used for communication? What are the limitations of microwave transmission? ⑥

Question : 1 (a) what are the concern of physical layer in ✦ internet model?

Answer :- The network physical layer is the lowest network layer in the open system interconnection (OSI) model. The primary concern of this ✦ layer is transmitted of ✦ individual bits from one ✦ node to another over a ⸰ physical medium.

This physical layer may be implemented PHY chip. The physical layer defines the means of transmitting row bits over a physical data link. connecting network nodes physical layer is the only one layer of OSI network model. which actually deals with the physical connectivity of two different stations.

Question 1(b): What is the purpose of multiplexing? Why do you need switching in data communication?

Answer: The purpose of multiplexing is to enable to be transmitted more efficiently over a given communication channel. Thereby decreasing transmission costs.

The another purpose of multiplexing is that we can transmit a large number of signals to a single medium. It is also used to communicate by means of a medium with com combinations of multiple signals.

~~Neede~~
Needed switching in data communication: In large networks there can be multiple paths from sender to recievere. The switching technique will decide the best route for data transmission.

Switching technique is used to connect the system for making one to-one communication. Besides switching are used connect multiple devices on the same network within a building or campus as a result we can easily transmit the data to each connected devices.

Question 1 (c): How does transmission media affect a network? What are the purpose of transmission media?

Answer: The higher bandwidth the more data transmission media can handle at once a lower bandwidth transmission media would not be able to carry as much data meaning that the data would take longer to be sent.

The more delays there are as the longer it takes to transmit data across a network. Latency is affected by the number of devices on the networks

and the types of connection device
The greater the number of devices
are connected to a network the more
important the choise of transmission
medium becomes.

<u>purpose of transmission media:</u> the transmiss.
media is a communication channel that
carries the information from the sender
to the reciever. Data is transmitted
through the electromagnetic signals. the
main functionality of the transmission
media is to carry the information in
the form of bits through LAN.
  It is the physical path between to
transmitter and reciever in data
communication.

Question: 2(a) What is the role of carrier signal in analog transmission? Which chip used in analog to digital.

Answer: In analog transmission the analog device produces a high-frequency signal that acts as a base for the information signal. This base signal is called the carrier, Signal or carrier frequency. The recieving device is tunned to the frequency of carrier signal that it expects from the senders.

A/D converter is used in analog to digital An A/D converter is used to convert an analog signal like voltage to digital form. So that it can be read. This is processed by a micro controller. Some micro controller have built in A/D converters.

Question 2(b) Why do you need digital to analog convertion? Is wifi analog or Digital.

Answer: Digital to analog conversion is a process of which digital signals having a few defined levels or states are converted into analog to signals having a very large number of stakes. Both the Digital to analog and analog to Digital conversions are of signature in many applications of digital signal processing.

Wifi Analog or Digital: Wifi can be analog and digital. Analog part of the wifi is the electromagnetic waves used to carry the data. Meanwhile the digital part is data transferred. You will need analog to digital converter to reciever. The data and vice versa. Digital to Analog to transmit.

As a result wifi will be both transmission analog and digital.

Question 2(c): What is wired transmission media? What is the difference between co-axial cable and twisted pair cable.

Answer: Guided media is a wired transmission media, in which data signal are guided along a physical path who within a wire. Guided transmission media is also known as Bounded or wired. Some well known guided transmission media includes twisted cables - coaxial cable, fibre optic cables.

Difference between coaxial cable and twisted pair cable:

coaxial cable	Twisted pair cable
Coaxial cable are difficult to install and implement	Twisted pair cables are easy to install and implement
Transmissions of signals happens via inner conductor of cable	Transmission of signals happens via metallics conducting wire

co-axial cable supports a bandwidth of moderate range.	Twisted pair cable supports a bandwid of low range.
Applications of co-axial cable are in internet connections, television signal distribution, and radio transmissions etc.	Application of twisted pair cable are in telephone networks and cable sheilding.
coaxial cable has finest protection as compared to twisted pair cable	In twisted pair cable there is lowest noise immunity
Cost of coxial cable is comparatively expensive	cost of twisted pair cable is less a compared to coaxial cable

Question 3(a) What happens to light when is transmitted?

Answer: When light hits an object it is transmitted, absorbed and reflected. The light on the left is reflected. The light on the middle is absorbed. and the light on the right is transmitted. Any object you can see must at least partially reflect light to your eyes. Object can also absorb or transmit light.

When light travel through a medium such as glass without being reflected, absorbed or scattered. When this happens light energy is not lost and can be considered 100% transmitted.

Question 5(b): What is the difference between frequency Division Multiplexing and time division multiplexing?

Answer:

Frequency division Multiplexing	Time division multiplexing
Multiplexing technique is analog.	Multiplexing technique is digital.
Not needed to Synchronization.	Neccessary to Synchronization.
Circuit orientation is complex.	Circuit orientation is comparatively simple
Cross talk exists	cross talk does not exist.
The available channel is used effectively	The available channel is used inefficientively.
Interference of signal are low and negligible.	Interference of signal is quite high.
Time sharing takes no place Frequency sharing takes place.	Time sharing takes place.
optical fibre cable or copper fibre cable Applies frequency division Multiplexing.	Telephone companies and internet service providers applies time division Multiplexing.

Question 3(c) What layers does a switching circuit take place? Is managed switch a router

Answer: circuit switching takes place at the physical layer. Before starting communication the stations must make a reservation fore the resources to be used during communication.

manage switch a router: Normally a router only has 4 LAN ports and one WAN port while switches have much more ports such as 12, 24, 48, etc.
Routers are used to connect two or more different networks while switches are used to connect two or more nodes in the same network.

Question 4(a) What is the role of transport layer?

Answer: Transport layer provides transport transfer of data between end users. providing reliable data transfer services to the upper layers. The transport layer controls the reliability of a given link through flow control, segmentation and desegmentation and error control.

Transport layer meeting the reliability requirements of applications if any multiplexing multiple communication streams from many users or applications on the same network.

Identifying the applications and services on the client and server that shall handle transmitted data.

Segmenting data at the source and reassembling the data at the destination.

Tracking the individual communication streams between applications on the source and destination hosts.

Identifying the proper application for each communication stream through the use of port numbers.

It also provides other services such as reliable data transfer, bandwidth guarantees and delay guarantees.

Question 4(b). What are the design issue
transport layer? Which devices use from
layer?

Answer: Accepting data from session Layer.
Spilit it into Segments and send to
the network layer. Ensure correct
delivery of data with efficiently. Isolate
upper layers from the technological changes
Error control and flow control.

Devices use of transport layer: The device
uses of transport layer that typically
operate are network devices or gateways.
The transport layer of the TCP/IP model
corresponds to the transport layer of
the OSI model.

Question 4 (c) What is used to set up end to end communication that takes place between host? Does not provide reliable end to end communication?

Answer: TCP is connection oriented. It eastablishes a logical end to end connection between the two communicating hosts. Control information called a handshake is exchanged. Between the two endpoints to eastablish a dialogue before data is transmitted.

TCP not UDP provides reliable end to end communication. Error Recovery by means of error detecting code and automatic repeat request protocol.

Question 5(a) What is transmission con[trol] protocol used for?

Answer: The transmission protocol is a transport protocol that is used on top of IP to ensure reliable transmission of packets. TCP includes mechanism to solve many of the problem that arise from packet based messaging such as lost packets, out of order packets and corrupted packets.

TCP is reliable because the protocol ensures two-way communication and all data is fully transmitterd and can be assembled by the receiver in the correct order.

Question 5 (b) Why do you need TCP connection management? How a TCP/IP connection is eastablished.

Answer:- TCP is a unicast connection oriented protocol. Before either end can send data to the other. A connection must be eastablished between them. TCP detects and repairs essentially all the data transfere problems that may be introduced by packet loss, duplication ore errors at the IP Layer.

Eastablished a TCP connection: To eastablish a connection, TCP uses a three way handshake. Before a client attemts to control connect with a server, the server must first bind to and listen at a port to open it up fore connection. This is called a passive open connection.

Question 5(c) How TCP terminates a conn
which protocols has flow control and
errcror controls.

Answer: TCP allows for transmit transmission
of information in both directions. This
means. that computere systems that
communicate overe TCP can send and recieve
data at the same data recieve time
similare to a telephone converesation. The
protocol uses segments as the basic
units of data transmission.

The connection teremination phase uses a
foure way handshake with each side
of the connection terminating independently
when an endpoint wishes to stop its half
of the connection. It transmit a FIN
packet. which the othere end acknowledge
with an ACK.

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

Flow control is meant only for the transmission of data from sender to reciever

Error Control is meant for the transmission of error free data from sender to Reciever.

Question 6(a) Which timer is importat for TCP reliability?

Answer: Keep-Alive timer is important for TCP reliability. A keep-alive timer is used to prevent a long idle connection between two TCPs. If a client opens a TCP connection to a server transfers some data and becomes silent the client will crash.

In this case the connection remains open forever. So a keep-alive timer is used this timer provides a mechanism to identify dead connections.

Question 6(b): What is the function of User datagram protocol (UDP)? Where is UDP used?

Answer: User data datagram is used for different task. User datagram is a communication protocol that is primarily used for eastablishing low-latency and loss tolercating connections between applicat on the internet. It speeds up transmission by enabling the transfer of data before an agreement is provided by the receiving party.

When a IP delivers a UDP datagram the host checks the port number and delivers the data to the corresponding applications. In this way UDP provides simple multiplexing over IP to allow a host to send and recieve data on multiple distinct ports.

<u>Using of UDP</u>: UDP is commonly used for applications that are lossy (can handle some packet loss) such as streaming audio and video. <u>It is</u> also used for query-response applications, such as DNS queries.

Numerious key internet applications use UDP. Because UDP datagram are used for sending bits of data known as packets over the internet.

<u>Question 6(c)</u> How does UDP esstablish a connection? write down the Application of UDP?

<u>Answer:</u> To transmit a UDP datagram a computere complete the appropriate fields in the UDP headere and forward the data togethere with the headere for transmission by the IP network layere.

UDP is transport layer protocol. Defined for use with the IP networks layer protocol. UDP communications consequently does not incur a connection establishment and teardown overheads. and there is a minimal associated end system state.

Application of UDP:

① Used for simple request response communication when size of data is less and hence there is lesser concern about flow and error control.

② It is suitable protocol for multicasting as UDP supports packet switching.

③ UDP is used for some routing update protocols like Routing information protocol. (RIP)

④ Normally used for real time applications which can not tolerate uneven delays between sectim of a recieved message.

③ UDP takes datagram from network layer attach its header and send it to [...] So it works fast.

④ Application layer can do some of the tasks through UDP —

→ Trace Route
→ Record Route
→ Time & Stamp.

⑤ Following implementations used as UDP as a transport layer protocol

→ NTP
→ DNS
→ BooTP / DHEP
→ NNP
→ Quate of the day protocol.

Question 7 (a) Why is digital transmission preferred over analog? How is a digital signal transmitted.

Answer: A digital signal can be transmitted over a dedicated connection between two or more users. In order to transmit analog data it must first be converted into a digital form. This process called sampling or encoding. Sampling involves two steps:

(i) Take measurements at regular sampling intervals and

(ii) Convert the value of the measurement into binary code.

Digital transmission preferred over analog because of effect of distortion, noise and interference is much then in Digital signal.

Question 2(b): What is the process of converting digital data to digital signal. Why digital data not easily affected by noise.

Answer: The process for converting digital data into digital signal is said to be line coding. Digital data is found in binary format. It is represented or stored internally as series of 1s and 0s. Digital signal is denoted by discreate signal which represents digital data.

Three types of line coding schemes:

1. Uni-polare encoding
2. Polare encoding
3. Bipolare encoding.

Unipolare encoding: Unipolare encoding use single voltage level to represent data. In this case to represent binary 1 High voltage is transmitted and to represent Low voltage is 0.

polare encoding: polare encoding sehema uses multiple voltage levels to represent binary values.

Bipolare Encoding: Bipolare encoding uses three voltage levels positive negative and zero. Zero voltage represent binary 0 and bit 1 is represented by altering positive and negative voltage.

Digital Data not easily affected by noise:

Noise is inevitable in a signal transmiss. In a digital transmission the amplitude of the noise must be higher than the amplitude of the signal at binary 1 which is generally not the ease and vice versa.

Z(c) Why is quantization required in Digital transmission ? When data can flow in booth direction?

Ans: Quantization is required to reduce the all computation demand and increase power efficiency . Quantization is an umbrella term that covers a lot of different techniques to convert input values from a large set to output values in a smaller set

Data flow in booth direction: Full duplex can flow data in both direction In a duplex type of topology or communication data ore information con be transformed in both direction .

Question : 8 (a)   How does wireless transmission
work ?

Answer :   The transmission of data wirelessly
is made possible by the manipulation
of radio waves. These waves are generated
naturally by generating pulse of electricity
These radio waves aen then be modified
by their amplitude or frequency in order
to transmit sound or data.

Wireless local area network use a high
frequency radio technology similar to
Digital cellular and a low frequency
radio technology. Wireless LAN are used
to spread spectrum technology to enable
communicate between multiple devices
in a limited area.

Question 8(b) How does a radio signal en
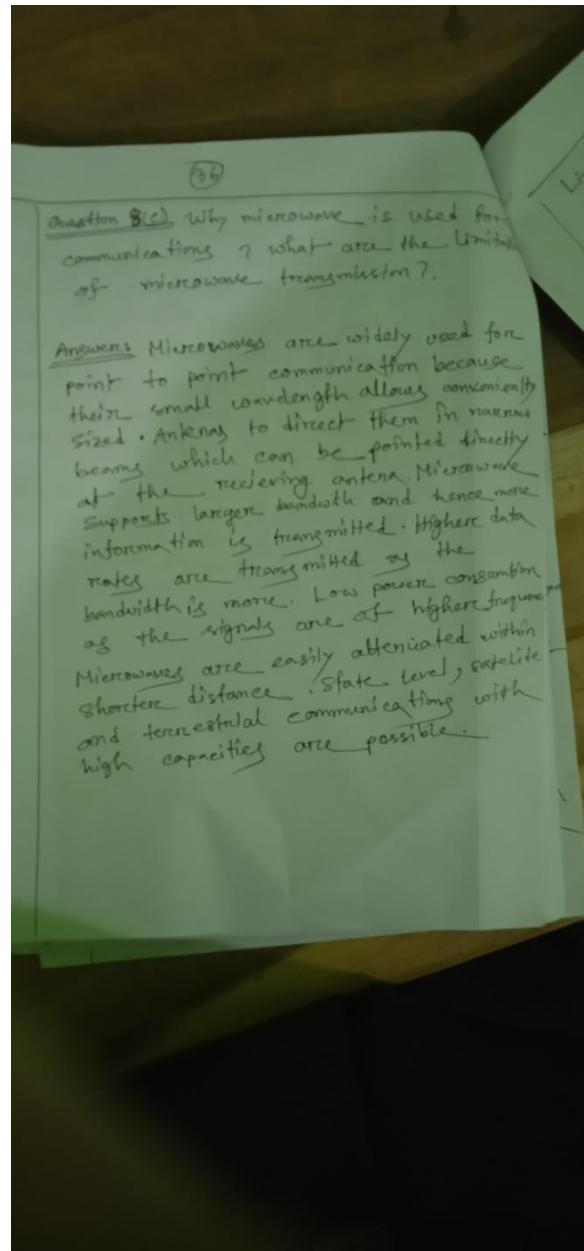How do you radio waves go through wall

Answer: A radio wave is generated by a
transmittere and then detected by a recievere.
An antonna allows a radio transmittere to
send energy into space and a recievere
to pick up energy from space. Transmittere
and recievere are typically designed to
operate overc a limited range of
frequencies.

Radio transmittere is an electronic circuit
which transforms electric powerc from
a powerc sourcee a battery or mains
powere, into a radio frequency.

Altering current to apply to the apply antenna
and antenna radiates the energy from
this current as radio waves.

Radio waves go through walls: Radio waves are much bigger than light waves Radio waves are bigger than the size of atoms in a wall that's why they go through wall. While light is a small wave and cannot get through the wall. If the wall is made out of glass light will go through it

On the other hand if the wall is made out of iron the radio wave will not go through the wall

Question 8(c) Why microwave is used for communications? what are the limitation of microwave transmission?

Answer: Microwaves are widely used for point to point communication because their small wavelength allows conveniently sized Antenna to direct them in narrow beams which can be pointed directly at the receiving antenna. Microwave supports larger bandwidth and hence more information is transmitted. Higher data rates are transmitted as the bandwidth is more. Low power consumption as the signals are of higher frequency. Microwaves are easily attenuated within shorter distance. State level, satelite and terrestrial communications with high capacities are possible.

Limitation of Micro waves transmission:

① Cost of microwave equipment are installation cost is high.

② They are hefty and occupy more space

③ Electromagnetic interference may occur

④ Variations in dielectric properties with temperatures may occur

⑤ Inherent inefficiency of electric power.