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CLASS TEST-03

Question no: 01

a) What is physical layer? What are the different types of physical media?

b) Discuss the functions of Physical Layer

c) Design a issues with Physical Layer.

Question no: 02

~~a) What is the function~~

a) What are physical layer devices?

b) Explain the physical signaling sublayer.

c) Discuss the services of physical layer.

Question no: 03

a) Is WiFi physical layer ?

b) Discuss the ~~signals of~~ physical layer in the internet protoco

c) Explain the transmission impairment of physical lay

Question no: 04

a) Shortly discuss digital-to-digital conversion.

b) Explain the types of line coding schemes

c) Including graph discuss Digital-to-Analog coversio

Question no: 05

a) How many types of twisted pair cables are there ?

b) Distingush between Infrared transmission and rad transmission.

c) With a graph, explain the light transmission.

Question no: 06

a) What is physical layer security? What are the different types of physical media?

b) Show the difference between frequency division multiplexing and time division multiplexing.

c) Explain the circuit switching.

Question no: 07

a) Define the transport layer

b) Explain the functions of Transport Layer

c) Design a issues with Transport Layer. Show a b diagram of a function of the transport layer.

Question no: 08

a) What ~~is a transport layer segment?~~ are the transport layer elements?

b) Write down the features of UDP.

(a) Discuss about the UDP Header and write down the application of UDP.

Ans to the question no: 01(a)

In the seven-layer open system interconnection model (OSI model) of computer networking, the physical layer or layer 1 is the first and lowest layer. This layer may be implemented by a PHY chip. The physical layer defines the means of transmitting raw bits over a physical data link connecting network nodes.

There are three types of physical media and they are:

1. Copper wire
2. Optical fiber
3. Coaxial cables

Ans to the question no: 01(b)

Funations of Physical Layer:

Following are various funations performed by the Physical layer of the OSI model.

1. Representation of Bits: Data in this layer consists of stream of bits. The bits must be encoded into signals for transmission.

2. Data Rate: This layer defines the rate of transmission which is the number of bits per second.

3. Synchronization: It deals with the synchronization of the transmitter and receiver.

4. Interface: The physical layer defines the transmissi interface between devices and transmission medium.

5. Line Configuration: This layer connects devices wi the medium.

6. Topologies: Devices must be connected using the following topologies: Mesh, Star, Ring.

7. Deals with baseband and broadband transmission

Ans to the question no: 09 (c)

* The Physical Layer is concerned with transmitting raw bits over a communication channel.

* The design issue has to do with making sure that whe one side sends a 1 bit, it is received by the other side as a 1 bit and not as a 0 bit.

* The design issues here largely deal with mechanical electrical and timing interfaces and the physical transmission medium which lies below the physic layer.

Ans to the question no: 02(a)

Devices that operate at the physical layer include repeaters, hubs, networks interface cards (NICs), cables and connectors. Repeaters are used to regenerate electrical signals that have attenuated (i.e. weakend) as a result of distance.

Ans to the question no: 02(b)

In a network using open systems interconnection (OSI) architecture, the physical signaling sublayer is the portion of the physical layer that

* Interfaces with data link layer's medium access control (MAC) sublayer.

* Performs symbol encoding, transmission, reception and decoding and
* Performs galvanic isolation.

Ans to the question no: 02 (c)

The major functions and services performed by the physical layer are: The physical layer performs bit-by-bit or symbol data delivery over a physical transmission medium. It provides a standardized interface to the transmission medium including a mechanical specification of electrical connectors and cables for example medium cable length, an electrical specification of transmission of signa strength, analog bandwidth etc. The transmission

medium may be electrical or optical over optical fiber or a wireless IR communication link. To optimize reliability and efficiency, signal processing techniques such as equalization, training sequences and pulse shaping may be used. Error correction codes and techniques including forward may be applied to further improve reliability.

Ans to the question no:03(a)

IEEE 802.11 standard, popularly known as Wifi, lays down the architecture and specifications of wireless LANs (WLANs). WiFi or WLAN used high frequency radio waves instead of cables for

connecting the devices in LAN. Users connected by WLANs can move around within the area of network coverage.

Ans the question no: 03(b)

The Internet protocol suite, as defined in RFC 1122 and RFC 1123 is a high-level networking description used for the Internet and similar networks. It does not define an equivalent layer that deals exclusively with hardware-level specifications and Interfaces, as this model does not concern itself directly with physical interfaces. Several RFCs mention a physical layer and data link

layer but that is in the context of IEEE protocols. RFC 1122 and 1123 do not mention any physical layer functionality of physical layer standards.

Ans to the question no:03 (a)

When signals travel through the medium they tend to deteriorate. This may have many reasons as given:

Attenuation: For the receiver to interpret the data accurately, the signal must be sufficiently strong. When the signal passes through the medium.

Dispersion: As signals travels through the media, it tends to spread and overlaps. The amount o

dispersion depends upon the frequency used.

Delay distortion: Signals are sent over media wi
pre-defined - speed and frequency. If the signal
speed and frequency do not match, there are p
ilities that signals reaches destination in arbi
fashion.

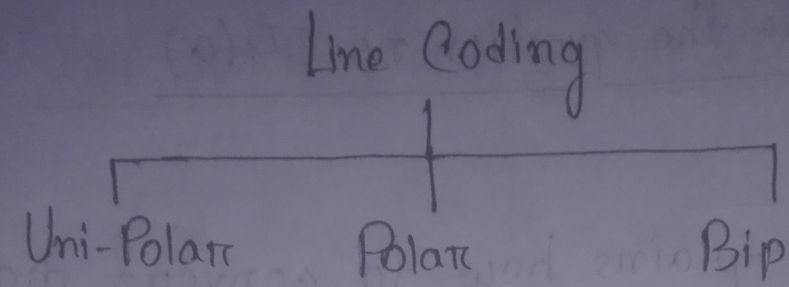
Noise: Random disturbance or fluctuation in
or digital signal is said to be Noise in si
which may distort the actual information
carried.

Ans to the question no: 04(a)

The section explains how to convert digital dat into digital signals. It can be done in two wa line coding and block coding. For all communi line coding is necessary whearas as block co is optional.

Ans to the question no: 04(b)

The process for converting digital data into di signal is said to Line coding. Digital data is in binary format. It is represented inter as series of 1s and 0s.



Uni-polar: Uni-polar encoding schemes use single voltage level to represent data. In this case, to represent binary 1, high voltage is transmitted and to represent 0, no voltage is transmitted It is also called Uni-polar-Non-return-to-Z

Polar Encoding: Polar encoding scheme uses multi voltage levels to represent binary values. Polar encoding is available in four types

* Polar Non-Return to Zero
* Return to Zero
* Manchester
* Differential Manchester

Bipolar: Bipolar encoding uses three voltage levels, positive, negative and zero. Zero voltage represents binary 0 and bit 1 is represented by altering positive and negative voltages.

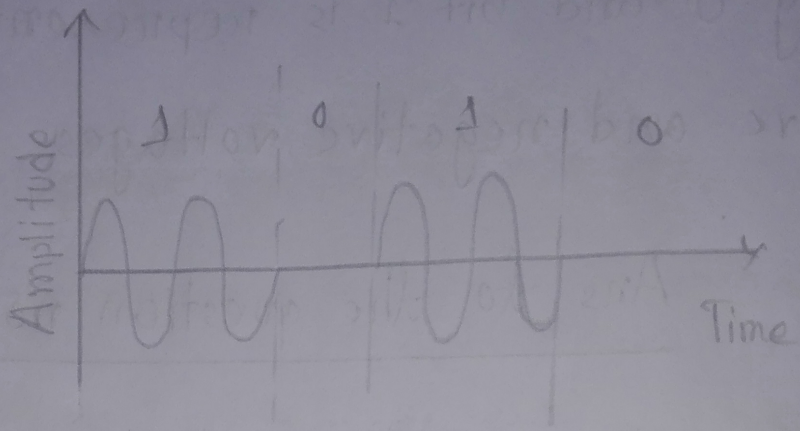
Ans to the question no: 04(c)

When data from one computer is sent to another via some analog carrier, it is first converted into analog signals. Analog signals are modified to refle digital data.

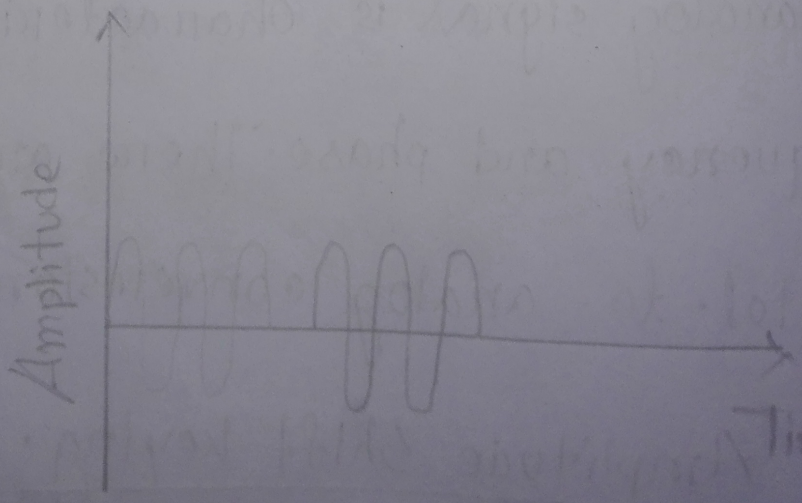
An analog signal is characterized by its amplitude, frequency and phase. There are three kinds of digital-to-analog conversions:

Amplitude Shift keying:

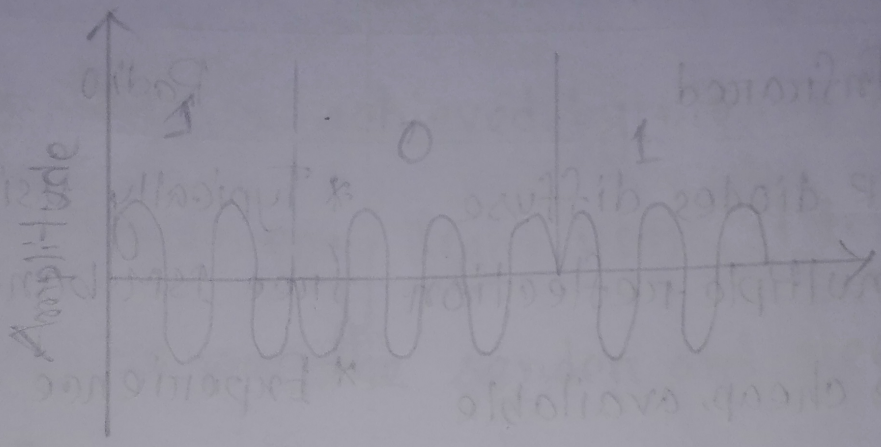
In this conversion technique, the amplitude of analog carrier signal is modified to reflect binary data.



Frequency Shift Keying: In this conversion technique, the frequency of the analog carrier signal is modified to reflect binary data. This technique uses two frequencies. f1 and f2.



Phase Shift keying: In this conversion scheme, the phase of the original carrier signal is altered to reflect the binary data.



Ans to the question no: 05 (a)

There are two types of twisted pair cables:

i) Sheilded Twisted Pair (STP) Cable

ii) Unsheilded Twisted Pair (UTP) Cable

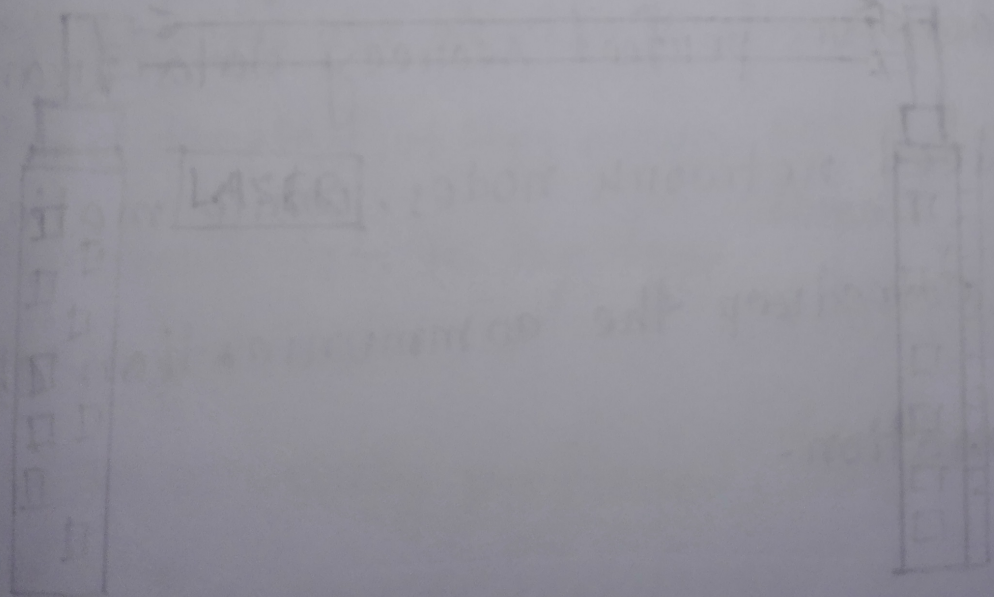
Ans to the question no: 05 (b)

Distinguish between Infrared transmission and Radio transmission:

Infrared	Radio
* Uses IR diodes, diffuse light, multiple-reflection	* Typically using the license free ISM band at 2.4 GHz.
* Simple cheap, available in many mobile devices.	* Experience from wireless HA and mobile phones can be use
* Interference by sunlight, heat sources etc.	* very limited license free frequency bands.
* Many things sheild or absorb IR light.	* Sheilding more difficult
* IrDA (Infrared Data Association) Interface available everywhere.	Interference with other electrical devices.
	* Many different prod

Ans to the question no:05 (c)

Highest most electromagnetic spectrum which can be used for data transmission is light for optical signaling. This is achieved by means of LASER. Because of frequency light uses, it tends to travel strictly is. Hence the senders and receiver must in one-of-sight.



LASER works as Tx (transmitter) and photo-detectors works as Rx (Receiver).

LASERS can not penetrate obstacles such as walls, rain and thick fog. LASER is safe for data transmission as it is very difficult to tap 1mm wide laser without interrupting the communication channel.

Ans to the question no:06 (a)

Physical layer security is an emerging security data area that achieves perfect secrecy data transmiss between indeed network nodes, while malicious nodes that eavesdrop the communication obtain zero information.

The different types of physical media are:

1. Copper wire
2. Optical fiber
3. Coaxial cables

Ans to the question no: 06 (b)

Difference between frequency division multiplexing and time division multiplexing:

FDM	TDM
* The signals which are to be multiplexed are added in the time domain. But they occupy different slots in the frequency domain	* The signals which are to be multiplexed can occupy the entire bandwidth in the time domain.
* FDM is usually preffered for the analog signals	* TDM is ~~preff~~ preferred for the digital signals.

FDM	TDM
* Synchronized is not required	* Synchronization is requi
* The FDM requires a complex circuitry at TX and RX.	* TDM circuitry is not very complex.
* Due to bandwidth fading in the TX medium all the FDM channels are affected.	* Due to fading only a fe TDM channels will be affected.

Ans to the question no: 06 (c)

Circuit switching is a switching technique that establishes a dedicated path between senders and receivers. In the circuit switching technique once the connection is established then the dedicated path will remain to exist until the connection is terminated. Circuit switching

is a network operates in a similar way as the telephone works. A complete end-to-end must exist before the communication takes place. Circuit switching is used in public telephone network. It is used for voice transmission. fixed data can be transferred at a time in circuit switching

Ans to the question no: 07(a)

In computer networking, the transport layer is a conceptual division of methods in the layered architecture of protocols in the network stack in the internet protocol suite and the OSI model. The protocols of this layer provide host-to-host

communication services for applications.

Ans to the question no: 07(b)

Functions of Transport Layer:

1. Service point Addressing: Transport Layer header includes service point address which is port address. This layer gets the message to the correct process on the computer like Network Layer.

2. Segmentation and Reassembling: A message is divide into segments; each segment contains sequence number, which enables this layer is reassembling the message. Message is reassembled correctly upon arrival at the destination.

3. flow control: In this layer, flow control is

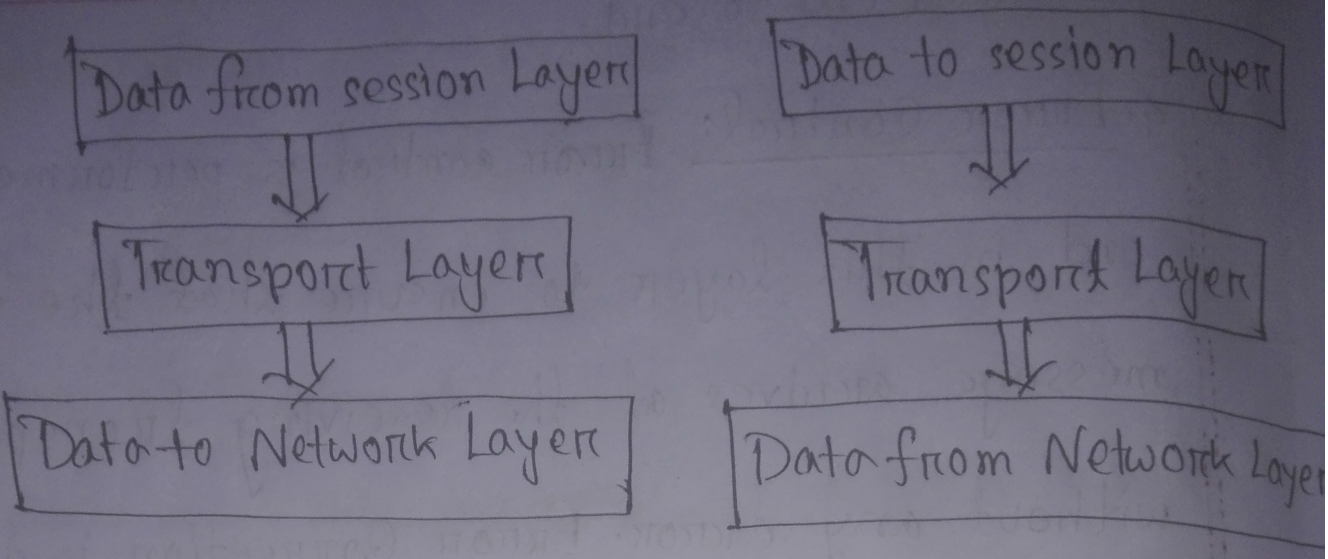
performed end to end.

4. Error Control: Error control is performed end t
end in this layer to ensure that the complete
message arrives at the receiving transport laye
without any error. Error Correction is done thro
gh retransmission.

Ans to the question no: 07(c)

Design a issues with transport layer:

* Accepting data from session layer, split it into segme
and send to the network layer.
* Ensure correct delivery of data with efficiency
* Isolate upper layers from the technological
changes.
* Error control and flow control.



Ans to the question no:08(a)

The elements of transport layer are:

* Transport
* Addressing
* Establishing a connection
* Releasing a connection
* Flow control and buffering
* Multiplexing
* Crash recovery

Ans to the question no:08(b)

Features of UDP:

* UDP is used when acknowledgement of data does not hold any significance.
* UDP is good protocol for data flowing in one direc
* UDP is simple and suitable for query based commu nications.
* UDP is not connection oriented
* UDP does not provide congestion control mechani
* UDP does not gurantee ordered delivery of data
* UDP is stateless
* UDP is suitable protocol for streaming applic tions as VoIP, multimedia streaming.

Ans to the question no: 08 (a)

UDP header is as simple as its function.

UDP header contains four main parameters:

Source port: This 16 bits information is used to identify the source port of the packet

Destination port: This 16 bits information is used identify application level service on destination machine.

Length: Length field specifies the entire length of UDP packet. It is 16-bits field and minimum value is 8-byte.

Checksum: This field stores the checksum value generated by the sender before sending. IPV4

has this field as optional so when checksum field does not contain any value it is made 0 and all its bits are set to zero.

UDP application:

Here are few applications where UDP is used to transmit data:

* Domain Name Services
* Simple Network Management Protocol.
* Trivial file Transfer Protocol
* Routing Information Protocol
* kerberos