DATA COMMUNICATION NETWORKING SANFOUNDRY

"Basics – 1".

1. The IETF standards documents are called _____
a) RFC
b) RCF
c) ID
d) DFC
View Answer

Answer: a
Explanation: RFC stands for Request For Comments and they are documents that describe methods, behaviors, research, or innovations applicable to the working of the Internet.

2. In the layer hierarchy as the data packet moves from the upper to the lower layers, headers are _____
a) Added
b) Removed
c) Rearranged
d) Modified
View Answer

Answer: a
Explanation: Each layer adds its own header to the packet from the previous layer. For example, in the Internet layer, the IP header is added over the TCP header on the data packet that came from the transport layer.

3. The structure or format of data is called _____
a) Syntax
b) Semantics
c) Struct
d) Formatting
View Answer

Answer: a
Explanation: The structure and format of data are defined using syntax. Semantics defines how a particular pattern to be interpreted, and what action is to be taken based on that interpretation. In programming languages, syntax of the instructions plays a vital role in designing of the program.

4. Communication between a computer and a keyboard involves _____ transmission.
a) Automatic
b) Half-duplex
c) Full-duplex
d) Simplex
View Answer
Answer: d
Explanation: In simplex transmission, data flows in single direction which in this case refers to the data flowing from the keyboard to the computer. Another example would be of the mouse where the data flows from the mouse to the computer only.

5. The first Network was called _____
a) CNNET
b) NSFNET
c) ASAPNET
d) ARPANET
View Answer
Answer: d
Explanation: ARPANET stands for Advanced Research Projects Agency Networks. It was the first network to be implemented which used the TCP/IP protocol in the year 1969.

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6. A _____ is the physical path over which a message travels.
a) Path
b) Medium
c) Protocol
d) Route
View Answer
Answer: b
Explanation: Messages travel from sender to receiver via a physical path called the medium using a set of methods/rules called protocol. Mediums can be guided (wired) or unguided (wireless).

7. Which organization has authority over interstate and international commerce in the communications field?
a) ITU-T
b) IEEE
c) FCC
d) ISOC
View Answer

Answer: c

Explanation: FCC is the abbreviation for Federal Communications Commission. FCC is responsible for regulating all interstate communications originating or terminating in USA. It was founded in the year 1934.

8. Which of this is not a network edge device?
a) PC
b) Smartphones
c) Servers
d) Switch
View Answer

Answer: d

Explanation: Network edge devices refer to host systems, which can host applications like web browser. A switch can't operate as a host, but as a central device which can be used to manage network communication.

9. A _____ set of rules that governs data communication.
a) Protocols
b) Standards
c) RFCs
d) Servers
View Answer

Answer: a

Explanation: In communications, a protocol refers to a set of rules and regulations that allow a network of nodes to transmit and receive information. Each layer in the network model has a protocol set, for example, the transport layer has TCP and UDP protocols.

10. Three or more devices share a link in _____ connection.
a) Unipoint
b) Multipoint
c) Point to point
d) Simplex
View Answer

Answer: b

Explanation: A multipoint communication is established when three or many network nodes are connected to each other. Frame relay, Ethernet and ATM are some examples of multipoint connections.

"Basics – 2".

1. When collection of various computers seems a single coherent system to its client, then it is called _____
a) computer network
b) distributed system
c) networking system
d) mail system
View Answer

Answer: b
Explanation: A Computer network is defined as a collection of interconnected computers which uses a single technology for connection.
A distributed system is also the same as computer network but the main difference is that the whole collection of computers appears to its users as a single coherent system.
Example:- World wide web

2. Two devices are in network if _____
a) a process in one device is able to exchange information with a process in another device
b) a process is running on both devices
c) PIDs of the processes running of different devices are same
d) a process is active and another is inactive
View Answer

Answer: a
Explanation: A computer network, or data network, is a digital telecommunications network which allows nodes to share resources. In computer networks, computing devices exchange data with each other using connections between nodes. The nodes have certain processes which enable them to share a specific type of data using a distinct protocol.

3. Which of the following computer networks is built on the top of another network?
a) prior network
b) chief network
c) prime network
d) overlay network
View Answer

Answer: d
Explanation: An overlay network is a computer network that is built on top of another network. Some examples of an overlay network are Virtual Private Networks (VPN) and Peer-to-Peer Networks (P2P).

4. In computer network nodes are _____
a) the computer that originates the data
b) the computer that routes the data
c) the computer that terminates the data
d) all of the mentioned

View Answer

Answer: d
Explanation: In a computer network, a node can be anything that is capable of sending data or receiving data or even routing the data to its destination. Routers, Computers and Smartphones are some examples of network nodes.

5. Communication channel is shared by all the machines on the network in _____
a) broadcast network
b) unicast network
c) multicast network
d) anycast network

View Answer

Answer: a
Explanation: In a broadcast network, information is sent to all stations in a network whereas in a multicast network the data or information is sent to a group of stations in the network. In unicast network, information is sent to only one specific station. The broadcast address of the network is the last assigned address of the network.

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6. Bluetooth is an example of _____
a) personal area network
b) local area network
c) virtual private network
d) wide area network

View Answer

Answer: a
Explanation: Bluetooth is a wireless technology used to create a wireless personal area network for data transfer up to a distance of 10 meters. It operates on 2.45 GHz frequency band for transmission.

7. A _____ is a device that forwards packets between networks by processing the routing information included in the packet.
a) bridge
b) firewall
c) router

d) hub

Answer: c

Explanation: A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet. They make use of routing protocols like RIP to find the cheapest path to the destination.

8. A list of protocols used by a system, one protocol per layer, is called _____
a) protocol architecture
b) protocol stack
c) protocol suite
d) protocol system

Answer: b

Explanation: A protocol stack refers to a group of protocols that are running concurrently that are employed for the implementation of network protocol suite. Each layer in the network model has to use one specific protocol from the protocol stack.

9. Network congestion occurs _____
a) in case of traffic overloading
b) when a system terminates
c) when connection between two nodes terminates
d) in case of transfer failure

Answer: a

Explanation: Network congestion occurs when traffic in the network is more than the network could handle. To avoid network congestion, the network management uses various open-loop and closed-loop congestion control techniques.

10. Which of the following networks extends a private network across public networks?
a) local area network
b) virtual private network
c) enterprise private network
d) storage area network

Answer: b

Explanation: A virtual private network extends a private network across a public network, and enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network.VPN provides enhanced security and online anonymity to users on the internet. It is also used to unblock websites which are unavailable in certain regions.

"Physical Layer".

1. The physical layer is concerned with _____
a) bit-by-bit delivery
b) process to process delivery
c) application to application delivery
d) port to port delivery
View Answer
Answer: a
Explanation: Physical layer deals with bit to bit delivery in networking. The data unit in the physical layer is bits. Process to process delivery or the port to port delivery is dealt in the transport layer. The various transmission mediums aid the physical layer in performing its functions.

2. Which transmission media provides the highest transmission speed in a network?
a) coaxial cable
b) twisted pair cable
c) optical fiber
d) electrical cable
View Answer
Answer: c
Explanation: Fiber optics is considered to have the highest transmission speed among the all mentioned above. The fiber optics transmission runs at 1000Mb/s. It is called as 1000Base-Lx whereas IEEE standard for it is 802.3z. It is popularly used for modern day network connections due to its high transmission rate.

3. Bits can be sent over guided and unguided media as analog signal by _____
a) digital modulation
b) amplitude modulation
c) frequency modulation
d) phase modulation
View Answer
Answer: a
Explanation: In analog modulation, digital low frequency baseband signal (digital bit stream) is transmitted over a higher frequency. Whereas in digital modulation the only difference is that the base band signal is of discrete amplitude level. The bits are represented by only two frequency levels, one for high and one for low.

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4. The portion of physical layer that interfaces with the media access control sublayer is called _____
a) physical signalling sublayer
b) physical data sublayer
c) physical address sublayer
d) physical transport sublayer
View Answer

Answer: a
Explanation: The portion of physical layer that interfaces with the medium access control sublayer is Physical Signaling Sublayer. The main function of this layer is character encoding, reception, decoding and performs optional isolation functions. It handles which media connection the signal should be forwarded to physically.

5. The physical layer provides _____
a) mechanical specifications of electrical connectors and cables
b) electrical specification of transmission line signal level
c) specification for IR over optical fiber
d) all of the mentioned
View Answer

Answer: d
Explanation: Anything dealing with a network cable or the standards in use – including pins, connectors and the electric current used is dealt in the physical layer (Layer 1). Physical layer deals with bit to bit delivery of the data aided by the various transmission mediums.

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6. In asynchronous serial communication the physical layer provides _____
a) start and stop signalling
b) flow control
c) both start & stop signalling and flow control
d) only start signalling
View Answer

Answer: c
Explanation: In asynchronous serial communication, the communication is not synchronized by clock signal. Instead of a start and stop signaling and flow control method is followed. Unlike asynchronous serial communication, in synchronous serial communication a clock signal is used for communication, so the start and stop method is not really required.

7. The physical layer is responsible for _____
a) line coding
b) channel coding
c) modulation
d) all of the mentioned
View Answer

Answer: d
Explanation: The physical layer is responsible for line coding, channel coding and modulation that is needed for the transmission of the information. The physical configuration including pins, connectors and the electric current used is dealt in the physical layer based on the requirement of the network application.

8. The physical layer translates logical communication requests from the _____ into hardware specific operations.
a) data link layer
b) network layer
c) trasnport layer
d) application layer
View Answer

Answer: a
Explanation: Physical layer accepts data or information from the data link layer and converts it into hardware specific operations so as to transfer the message through physical cables. Some examples of the cables used are optical fiber cables, twisted pair cables and co-axial cables.

9. A single channel is shared by multiple signals by _____
a) analog modulation
b) digital modulation
c) multiplexing
d) phase modulation
View Answer

Answer: c
Explanation: In communication and computer networks, the main goal is to share a scarce resource. This is done by multiplexing, where multiple analog or digital signals are combined into one signal over a shared medium. The multiple kinds of signals are designated by the transport layer which is the layer present on a higher level than the physical layer.

10. Wireless transmission of signals can be done via _____
a) radio waves
b) microwaves
c) infrared

View Answer

Answer: d

Explanation: Wireless transmission is carried out by radio waves, microwaves and IR waves. These waves range from 3 Khz to above 300 Ghz and are more suitable for wireless transmission. Radio waves can penetrate through walls and are used in radio communications, microwaves and infrared (IR) waves cannot penetrate through walls and are used for satellite communications and device communications respectively.

"Data Link Layer".

1. The data link layer takes the packets from _____ and encapsulates them into frames for transmission.
a) network layer
b) physical layer
c) transport layer
d) application layer
View Answer

Answer: a

Explanation: In computer networks, the data from application layer is sent to transport layer and is converted to segments. These segments are then transferred to the network layer and these are called packets. These packets are then sent to data link layer where they are encapsulated into frames. These frames are then transferred to physical layer where the frames are converted to bits. Error control and flow control data is inserted in the frames at the data link layer.

2. Which of the following tasks is not done by data link layer?
a) framing
b) error control
c) flow control
d) channel coding
View Answer

Answer: d

Explanation: Channel coding is the function of physical layer. Data link layer mainly deals with framing, error control and flow control. Data link layer is the layer where the packets are encapsulated into frames.

3. Which sublayer of the data link layer performs data link functions that depend upon the type of medium?

a) logical link control sublayer
b) media access control sublayer
c) network interface control sublayer
d) error control sublayer
View Answer
Answer: b
Explanation: Media access control (MAC) deals with transmission of data packets to and from the network-interface card, and also to and from another remotely shared channel. The MAC sublayer also prevents collision using protocols like CSMA/CD.

4. Header of a frame generally contains _____
a) synchronization bytes
b) addresses
c) frame identifier
d) all of the mentioned
View Answer
Answer: d
Explanation: In a frame, the header is a part of the data that contains all the required information about the transmission of the file. It contains information like synchronization bytes, addresses, frame identifier etc. It also contains error control information for reducing the errors in the transmitted frames.

5. Automatic repeat request error management mechanism is provided by _____
a) logical link control sublayer
b) media access control sublayer
c) network interface control sublayer
d) application access control sublayer
View Answer
Answer: a
Explanation: The logical link control is a sublayer of data link layer whose main function is to manage traffic, flow and error control. The automatic repeat request error management mechanism is provided by the LLC when an error is found in the received frame at the receiver's end to inform the sender to re-send the frame.

6. When 2 or more bits in a data unit has been changed during the transmission, the error is called _____
a) random error
b) burst error

c) inverted error
d) double error
View Answer
Answer: b
Explanation: When a single bit error occurs in a data, it is called single bit error. When more than a single bit of data is corrupted or has error, it is called burst error. If a single bit error occurs, the bit can be simply repaired by inverting it, but in case of a burst error, the sender has to send the frame again.

7. CRC stands for _____
a) cyclic redundancy check
b) code repeat check
c) code redundancy check
d) cyclic repeat check
View Answer
Answer: a
Explanation: Cyclic redundancy check is a code that is added to a data which helps us to identify any error that occurred during the transmission of the data. CRC is only able to detect errors, not correct them. CRC is inserted in the frame trailer.

8. Which of the following is a data link protocol?
a) ethernet
b) point to point protocol
c) hdlc
d) all of the mentioned
View Answer
Answer: d
Explanation: There are many data link layer protocols. Some of them are SDLC (synchronous data link protocol), HDLC (High level data link control), SLIP (serial line interface protocol), PPP (Point to point protocol) etc. These protocols are used to provide the logical link control function of the Data Link Layer.

9. Which of the following is the multiple access protocol for channel access control?
a) CSMA/CD
b) CSMA/CA
c) Both CSMA/CD & CSMA/CA
d) HDLC
View Answer
Answer: c
Explanation: In CSMA/CD, it deals with detection of collision after collision has occurred, whereas CSMA/CA deals with preventing collision. CSMA/CD is abbreviation for Carrier Sensing Multiple Access/Collision detection. CSMA/CA is abbreviation for

Carrier Sensing Multiple Access/Collision Avoidance. These protocols are used for efficient multiple channel access.

10. The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is called _____
a) piggybacking
b) cyclic redundancy check
c) fletcher's checksum
d) parity check
View Answer
Answer: a
Explanation: Piggybacking is a technique in which the acknowledgment is temporarily delayed so as to be hooked with the next outgoing data frame. It saves a lot of channel bandwidth as in non-piggybacking system, some bandwidth is reserved for acknowledgement.

"Network Layer".

1. The network layer is concerned with _____ of data.
a) bits
b) frames
c) packets
d) bytes
View Answer
Answer: c
Explanation: In computer networks, the data from the application layer is sent to the transport layer and is converted to segments. These segments are then transferred to the network layer and these are called packets. These packets are then sent to data link layer where they are encapsulated into frames. These frames are then transferred to physical layer where the frames are converted to bits.

2. Which one of the following is not a function of network layer?
a) routing
b) inter-networking
c) congestion control
d) error control
View Answer
Answer: d
Explanation: In the OSI model, network layer is the third layer and it provides data

routing paths for network communications. Error control is a function of the data link layer and the transport layer.

3. A 4 byte IP address consists of _____
a) only network address
b) only host address
c) network address & host address
d) network address & MAC address
View Answer
Answer: c
Explanation: An ip address which is 32 bits long, that means it is of 4 bytes and is composed of a network and host portion and it depends on address class. The size of the host address and network address depends upon the class of the address in classful IP addressing.

4. In virtual circuit network each packet contains _____
a) full source and destination address
b) a short VC number
c) only source address
d) only destination address
View Answer
Answer: b
Explanation: A short VC number also called as VCID (virtual circuit identifier) is a type of identifier which is used to distinguish between several virtual circuits in a connection oriented circuit switched network. Each virtual circuit is used to transfer data over a larger packet switched network.

5. Which of the following routing algorithms can be used for network layer design?
a) shortest path algorithm
b) distance vector routing
c) link state routing
d) all of the mentioned
View Answer
Answer: d
Explanation: The routing algorithm is what decides where a packet should go next. There are several routing techniques like shortest path algorithm, static and dynamic routing, decentralized routing, distance vector routing, link state routing, Hierarchical routing etc. The routing algorithms go hand in hand with the operations of all the routers in the networks. The routers are the main participants in these algorithms.

6. Which of the following is not correct in relation to multi-destination routing?
a) is same as broadcast routing
b) contains the list of all destinations
c) data is not sent by packets
d) there are multiple receivers
View Answer
Answer: c
Explanation: In multi-destination routing, there is more than one receiver and the route for each destination which is contained in a list of destinations is to be found by the routing algorithm. Multi-destination routing is also used in broadcasting.

7. A subset of a network that includes all the routers but contains no loops is called _____
a) spanning tree
b) spider structure
c) spider tree
d) special tree
View Answer
Answer: a
Explanation: Spanning tree protocol (STP) is a network protocol that creates a loop free logical topology for ethernet networks. It is a layer 2 protocol that runs on bridges and switches. The main purpose of STP is to ensure that you do not create loops when you have redundant paths in your network.

8. Which one of the following algorithm is not used for congestion control?
a) traffic aware routing
b) admission control
c) load shedding
d) routing information protocol
View Answer
Answer: d
Explanation: The Routing Information Protocol (RIP) is used by the network layer for the function of dynamic routing. Congestion control focuses on the flow of the traffic in the network and uses algorithms like traffic aware routing, admission control and load shedding to deal with congestion.

9. The network layer protocol for internet is _____
a) ethernet
b) internet protocol
c) hypertext transfer protocol

d) file transfer protocol

Answer: b

Explanation: There are several protocols used in Network layer. Some of them are IP, ICMP, CLNP, ARP, IPX, HRSP etc. Hypertext transfer protocol is for application layer and ethernet protocol is for data link layer.

10. ICMP is primarily used for _____
a) error and diagnostic functions
b) addressing
c) forwarding
d) routing

Answer: a

Explanation: ICMP abbreviation for Internet Control Message Protocol is used by networking devices to send error messages and operational information indicating a host or router cannot be reached. ICMP operates over the IP packet to provide error reporting functionality as IP by itself cannot report errors.

"Transport Layer".

1. Transport layer aggregates data from different applications into a single stream before passing it to _____
a) network layer
b) data link layer
c) application layer
d) physical layer

Answer: a

Explanation: The flow of data in the OSI model flows in following manner Application -> Presentation -> Session -> Transport -> Network -> Data Link -> Physical. Each and every layer has its own set of functions and protocols to ensure efficient network performance.

2. Which of the following are transport layer protocols used in networking?
a) TCP and FTP
b) UDP and HTTP
c) TCP and UDP

d) HTTP and FTP

Answer: c

Explanation: Both TCP and UDP are transport layer protocol in networking. TCP is an abbreviation for Transmission Control Protocol and UDP is an abbreviation for User Datagram Protocol. TCP is connection oriented whereas UDP is connectionless.

3. User datagram protocol is called connectionless because _____
a) all UDP packets are treated independently by transport layer
b) it sends data as a stream of related packets
c) it is received in the same order as sent order
d) it sends data very quickly

Answer: a

Explanation: UDP is an alternative for TCP and it is used for those purposes where speed matters most whereas loss of data is not a problem. UDP is connectionless whereas TCP is connection oriented.

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4. Transmission control protocol _____
a) is a connection-oriented protocol
b) uses a three way handshake to establish a connection
c) receives data from application as a single stream
d) all of the mentioned

Answer: d

Explanation: TCP provides reliable and ordered delivery of a stream of bytes between hosts communicating via an IP network. Major internet applications like www, email, file transfer etc rely on TCP. TCP is connection oriented and it is optimized for accurate delivery rather than timely delivery.

5. An endpoint of an inter-process communication flow across a computer network is called _____
a) socket
b) pipe
c) port
d) machine

Answer: a

Explanation: Socket is one end point in a two way communication link in the network.

TCP layer can identify the application that data is destined to be sent by using the port number that is bound to socket.

6. Socket-style API for windows is called _____
a) wsock
b) winsock
c) wins
d) sockwi
View Answer
Answer: b
Explanation: Winsock is a programming interface which deals with input output requests for internet applications in windows OS. It defines how windows network software should access network services.

7. Which one of the following is a version of UDP with congestion control?
a) datagram congestion control protocol
b) stream control transmission protocol
c) structured stream transport
d) user congestion control protocol
View Answer
Answer: a
Explanation: The datagram congestion control is a transport layer protocol which deals with reliable connection setup, teardown, congestion control, explicit congestion notification, and feature negotiation. It is used in modern day systems where there are really high chances of congestion. The protocol was last updated in the year 2008.

8. A _____ is a TCP name for a transport service access point.
a) port
b) pipe
c) node
d) protocol
View Answer
Answer: a
Explanation: Just as the IP address identifies the computer, the network port identifies the application or service running on the computer. A port number is 16 bits. The combination of IP address preceded with the port number is called the socket address.

9. Transport layer protocols deals with _____
a) application to application communication
b) process to process communication

c) node to node communication
d) man to man communication
View Answer
Answer: b
Explanation: Transport layer is 4th layer in TCP/IP model and OSI reference model. It deals with logical communication between process. It is responsible for delivering a message between network host.

10. Which of the following is a transport layer protocol?
a) stream control transmission protocol
b) internet control message protocol
c) neighbor discovery protocol
d) dynamic host configuration protocol
View Answer
Answer: a
Explanation: The Stream Control Transmission Protocol (SCTP) is a transport layer protocol used in networking system where streams of data are to be continuously transmitted between two connected network nodes. Some of the other transport layer protocols are RDP, RUDP, TCP, DCCP, UDP etc.

"Topology".

1. Physical or logical arrangement of network is _____
a) Topology
b) Routing
c) Networking
d) Control
View Answer
Answer: a
Explanation: Topology in networks is the structure or pattern in which each and every node in the network is connected. There are many topologies in networking like bus, tree, ring, star, mesh, and hybrid topology. There is no particular best topology and a suitable topology can be chosen based on the kind of application of the network .

2. Which network topology requires a central controller or hub?
a) Star
b) Mesh
c) Ring

d) Bus

View Answer

Answer: a

Explanation: In star topology, no computer is connected to another computer directly but all the computers are connected to a central hub. Every message sent from a source computer goes through the hub and the hub then forwards the message only to the intended destination computer.

3. _____ topology requires a multipoint connection.
a) Star
b) Mesh
c) Ring
d) Bus

View Answer

Answer: d

Explanation: In bus topology, there is a single cable to which all the network nodes are connected. So whenever a node tries to send a message or data to other nodes, this data passes through all other nodes in the network through the cable. It is really simple to install but it's not secure enough to be used in most of the computer network applications.

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4. Data communication system spanning states, countries, or the whole world is _____
a) LAN
b) WAN
c) MAN
d) PAN

View Answer

Answer: b

Explanation: WAN is the abbreviation for Wide Area Network. This network extends over a large geographical area. WANs are used to connect cities, states or even countries. A wireless connection is required to build a WAN. The best example of WAN is the Internet.

5. Data communication system within a building or campus is_____
a) LAN
b) WAN
c) MAN

d) PAN
View Answer
Answer: a
Explanation: LAN is an abbreviation for Local Area Network. This network interconnects computers in a small area such as schools, offices, residence etc. It is the most versatile kind of data communication system where most of the computer network concepts can be visibly used.

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6. WAN stands for _____
a) World area network
b) Wide area network
c) Web area network
d) Web access network
View Answer
Answer: b
Explanation: WAN is the abbreviation for Wide Area Network. This network extends over a large geographical area. These are used to connect cities, states or even countries. They can be connected through leased lines or satellites.

7. In TDM, slots are further divided into _____
a) Seconds
b) Frames
c) Packets
d) Bits
View Answer
Answer: b
Explanation: TDM is the abbreviation for Time division multiplexing. It is technique for combining several low rate channels to a single high rate channel. For a certain time slot, the several channels could use the maximum bandwidth. Each channel is inactive for a period of time too. Some other multiplexing techniques are Frequency division multiplexing and Phase division multiplexing.

8. _____ is the multiplexing technique that shifts each signal to a different carrier frequency.
a) FDM
b) TDM
c) Both FDM & TDM
d) PDM
View Answer

Answer: a

Explanation: FDM is an abbreviation for Frequency Division Multiplexing. This technique is used when the bandwidth of the channel is greater than the combined bandwidth of all the signals which are to be transmitted. The channel is active at all times unless a collision occurs with another channel trying to use the same frequency. Some other multiplexing techniques are Time division multiplexing and Phase division multiplexing

"Multiplexing".

1. The sharing of a medium and its link by two or more devices is called _____
a) Fully duplexing
b) Multiplexing
c) Micropleixng
d) Duplexing
View Answer

Answer: b

Explanation: Multiplexing is a method using which one can send multiples signals through a shared medium at the same time. This helps in using less resources and thus saving the cost of sending messages.

2. Multiplexing is used in _____
a) Packet switching
b) Circuit switching
c) Data switching
d) Packet & Circuit switching
View Answer

Answer: b

Explanation: Circuit switching is a switching method by which one can obtain a physical path between end points. Circuit switching method is also called a connection oriented network. Two nodes must be physically and logically connected to each other to create a circuit switching network.

3. Which multiplexing technique used to transmit digital signals?
a) FDM
b) TDM
c) WDM
d) FDM & WDM
View Answer

Answer: b

Explanation: TDM abbreviation for Time Division Multiplexing is a method used for digital signals. Whereas FDM and WDM abbreviation for Frequency Division Multiplexing, and Wavelength Division Multiplexing, are used for analog signals. TDM is used in applications like ISDN (Integrated Services Digital Network) and PSTN (Public Switched Telephone Network).

4. If there are n signal sources of same data rate, then the TDM link has _____ slots.
a) n
b) n/2
c) n*2
d) 2^n
View Answer

Answer: a

Explanation: In TDM, the total unit of time is divided equally among all the signal sources and each and every source has access to the complete channel bandwidth during its allotted time slot. When the time slot of the source is not active, it remains idle and waits for its slot to begin.

5. If link transmits 4000frames per second, and each slot has 8 bits, the transmission rate of circuit this TDM is _____
a) 32kbps
b) 500bps
c) 500kbps
d) 32bps
View Answer

Answer: a

Explanation: Transmission rate= frame rate * number of bits in a slot.
Given: Frame rate = 4000/sec and number of bits in slot = 8
Thus, Transmission rate = (4000 * 8) bps
= 32000bps
= 32kbps

6. The state when dedicated signals are idle are called _____
a) Death period
b) Poison period
c) Silent period

d) Stop period
Answer: c
Explanation: There are instances when connection between two endpoints has been established, but no communication or transfer of messages occurs. This period of time is called silent period. The silent period ends when either of the two endpoints starts the communication.

7. Multiplexing provides _____
a) Efficiency
b) Privacy
c) Anti jamming
d) Both Efficiency & Privacy
Answer: d
Explanation: Multiplexing helps us to transfer our messages over a shared channel. This brings up the issue of privacy and efficiency. Fortunately, Multiplexing has high efficiency and high privacy when implemented because in the implementation, the transport layer of the OSI network model handles the function of multiplexing through interfaces called ports which provide the required efficiency and privacy.

8. In TDM, the transmission rate of a multiplexed path is always _____ the sum of the transmission rates of the signal sources.
a) Greater than
b) Lesser than
c) Equal to
d) Equal to or greater than
Answer: a
Explanation: In TDM the transmission rate provided by the path that is multiplexed will always be greater than the sum of transmission rates of the single sources. This happens because the transmission rate is provided to each source only for a small period of time.

9. In TDM, slots are further divided into _____
a) Seconds
b) Frames
c) Packets
d) Bits
Answer: b
Explanation: TDM is the abbreviation for Time division multiplexing. It is technique for

combining several low rate channels to a single high rate channel. For a certain time slot, the several channels could use the maximum bandwidth. Each channel is inactive for a period of time too. Some other multiplexing techniques are Frequency division multiplexing and Phase division multiplexing.

"Application Layer – 1".

1. Which is not a application layer protocol?
a) HTTP
b) SMTP
c) FTP
d) TCP
View Answer
Answer: d
Explanation: TCP is transport layer protocol.

2. The packet of information at the application layer is called _____
a) Packet
b) Message
c) Segment
d) Frame
View Answer
Answer: b
Explanation: For Application, Presentation and Session layers there is no data format for message. Message is message as such in these three layers. But when it comes to Transport, Network, Data and Physical layer they have data in format of segments, packets, frames and bits respectively.

3. Which one of the following is an architecture paradigms?
a) Peer to peer
b) Client-server
c) HTTP
d) Both Peer-to-Peer & Client-Server
View Answer
Answer: d
Explanation: HTTP is a protocol.

4. Application developer has permission to decide the following on transport layer side
a) Transport layer protocol
b) Maximum buffer size
c) Both Transport layer protocol and Maximum buffer size
d) None of the mentioned
View Answer

Answer: c
Explanation: Application layer provides the interface between applications and the network. So application developer can decide what transport layer to use and what should be its maximum buffer size.

5. Application layer offers _____ service.
a) End to end
b) Process to process
c) Both End to end and Process to process
d) None of the mentioned
View Answer

Answer: a
Explanation: End to End service is provided in the application layer. Whereas process to process service is provided at the transport layer.

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6. E-mail is _____
a) Loss-tolerant application
b) Bandwidth-sensitive application
c) Elastic application
d) None of the mentioned
View Answer

Answer: c
Explanation: Because it can work with available throughput.

7. Pick the odd one out.
a) File transfer
b) File download
c) E-mail
d) Interactive games
View Answer

Answer: d
Explanation: File transfer, File download and Email are services provided by the application layer and there are message and data oriented.

8. Which of the following is an application layer service?
a) Network virtual terminal
b) File transfer, access, and management
c) Mail service
d) All of the mentioned
View Answer
Answer: d
Explanation: The services provided by the application layer are network virtual terminal, file transfer, access and management, mail services, directory services, various file and data operations.

9. To deliver a message to the correct application program running on a host, the _____ address must be consulted.
a) IP
b) MAC
c) Port
d) None of the mentioned
View Answer
Answer: c
Explanation: IP address lets you know where the network is located. Whereas MAC address is a unique address for every device. Port address identifies a process or service you want to carry on.

10. Which is a time-sensitive service?
a) File transfer
b) File download
c) E-mail
d) Internet telephony
View Answer
Answer: d
Explanation: Internet telephony is Loss-tolerant other applications are not.

11. Transport services available to applications in one or another form _____
a) Reliable data transfer
b) Timing
c) Security
d) All of the mentioned
View Answer
Answer: d
Explanation: The transport services that are provided to application are reliable data transfer, security and timing. These are very important for proper end to end services.

12. Electronic mail uses which Application layer protocol?
a) SMTP
b) HTTP
c) FTP
d) SIP
View Answer
Answer: a
Explanation: Email uses various protocols like SMTP, IMAP and POP. The most prominent one used in application layer is SMTP.

"Application Layer – 2".

1. The _____ translates internet domain and host names to IP address.
a) domain name system
b) routing information protocol
c) network time protocol
d) internet relay chat
View Answer
Answer: a
Explanation: Domain name system is the way the internet domain names are stored and translated to IP addresses. The domain names systems matches the name of website to ip addresses of the website.

2. Which one of the following allows a user at one site to establish a connection to another site and then pass keystrokes from local host to remote host?
a) HTTP
b) FTP
c) Telnet
d) TCP
View Answer
Answer: c
Explanation: Telnet is used for accessing remote computers. Using telnet a user can access computer remotely. With Telnet, you can log on as a regular user with whatever privileges you may have been granted to the specific application and data on the computer.

3. Application layer protocol defines _____
a) types of messages exchanged
b) message format, syntax and semantics

c) rules for when and how processes send and respond to messages

d) all of the mentioned

View Answer

Answer: d

Explanation: Application layer deals with the user interface, what message is to be sent or the message format, syntax and semantics. A user has access to application layer for sending and receiving messages.

4. Which one of the following protocol delivers/stores mail to reciever server?

a) simple mail transfer protocol

b) post office protocol

c) internet mail access protocol

d) hypertext transfer protocol

View Answer

Answer: a

Explanation: SMTP, abbreviation for Simple Mail Transfer Protocol is an application layer protocol. A client who wishes to send a mail creates a TCP connection to the SMTP server and then sends the mail across the connection.

5. The ASCII encoding of binary data is called

a) base 64 encoding

b) base 32 encoding

c) base 16 encoding

d) base 8 encoding

View Answer

Answer: a

Explanation: Base64 is used commonly in a number of applications including email via MIME, and storing complex data in XML. Problem with sending normal binary data to a network is that bits can be misinterpreted by underlying protocols, produce incorrect data at receiving node and that is why we use this code.

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6. Which one of the following is an internet standard protocol for managing devices on IP network?

a) dynamic host configuration protocol

b) simple network management protocol

c) internet message access protocol

d) media gateway protocol

Answer: b

Explanation: SNMP is a set of protocols for network management and monitoring. This protocol is included in the application layer. SNMP uses 7 protocol data units.

7. Which one of the following is not an application layer protocol?
a) media gateway protocol
b) dynamic host configuration protocol
c) resource reservation protocol
d) session initiation protocol

Answer: c

Explanation: Resource reservation protocol is used in transport layer. It is designed to reserve resources across a network for quality of service using the integrated services model.

8. Which protocol is a signaling communication protocol used for controlling multimedia communication sessions?
a) session initiation protocol
b) session modelling protocol
c) session maintenance protocol
d) resource reservation protocol

Answer: a

Explanation: SIP is a signaling protocol in which its function includes initiating, maintaining and terminating real time sessions. SIP is used for signaling and controlling multimedia sessions.

9. Which one of the following is not correct?
a) Application layer protocols are used by both source and destination devices during a communication session
b) HTTP is a session layer protocol
c) TCP is an application layer protocol
d) All of the mentioned

Answer: d

Explanation: HTTP is an application layer protocol. Whereas TCP is a transport layer protocol.

10. When displaying a web page, the application layer uses the _____
a) HTTP protocol

b) FTP protocol
c) SMTP protocol
d) TCP protocol
View Answer
Answer: a
Explanation: HTTP is abbreviation for hypertext transfer protocol. It is the foundation of data communication for world wide web. This protocol decides how the message is formatted and transmitted etc.

"TCP-1".

1. Which of the following is false with respect to TCP?
a) Connection-oriented
b) Process-to-process
c) Transport layer protocol
d) Unreliable
View Answer
Answer: d
Explanation: TCP is a transport layer protocol that provides reliable and ordered delivery of a stream of bytes between hosts communicating via an IP network.

2. In TCP, sending and receiving data is done as _____
a) Stream of bytes
b) Sequence of characters
c) Lines of data
d) Packets
View Answer
Answer: a
Explanation: TCP provides stream oriented delivery between hosts communicating via an IP network and there are no message boundaries. TCP can concatenate data from a number of send () commands into one stream of data and still transmit it reliably.

3. TCP process may not write and read data at the same speed. So we need _____ for storage.
a) Packets
b) Buffers
c) Segments
d) Stacks
View Answer

Answer: b
Explanation: A TCP receiver has a receive buffer that is used to store the unprocessed incoming packets in case the sender is sending packets faster than the processing rate of the received packets.

4. TCP groups a number of bytes together into a packet called _____
a) Packet
b) Buffer
c) Segment
d) Stack
View Answer

Answer: c
Explanation: A segment may be collection of data from many send () statements. TCP transmits each segment as a stream of bytes.

5. Communication offered by TCP is _____
a) Full-duplex
b) Half-duplex
c) Semi-duplex
d) Byte by byte
View Answer

Answer: a
Explanation: Data can flow both the directions at the same time during a TCP communication hence, it is full-duplex. This is the reason why TCP is used in systems that require full-duplex operation such as e-mail systems.

6. To achieve reliable transport in TCP, _____ is used to check the safe and sound arrival of data.
a) Packet
b) Buffer
c) Segment
d) Acknowledgment
View Answer

Answer: d
Explanation: Acknowledgment mechanism is used to check the safe and sound arrival of data. The sender actively checks for acknowledgement from the receiver and once a specific time period has passed, it retransmits the data.

7. In segment header, sequence number and acknowledgement number fields refer to _____

a) Byte number
b) Buffer number
c) Segment number
d) Acknowledgment

View Answer

Answer: a
Explanation: As TCP has to ensure ordered delivery of packets, sequence number and acknowledgement number are used to identify the byte number of the packet in the stream of bytes being transmitted.

8. Suppose a TCP connection is transferring a file of 1000 bytes. The first byte is numbered 10001. What is the sequence number of the segment if all data is sent in only one segment?

a) 10000
b) 10001
c) 12001
d) 11001

View Answer

Answer: b
Explanation: The sequence number given to first byte of a segment, with respect to its order among the previous segments, is the sequence number of that segment.

9. Bytes of data being transferred in each connection are numbered by TCP. These numbers start with a _____

a) Fixed number
b) Random sequence of 0's and 1's
c) One
d) Sequence of zero's and one's

View Answer

Answer: d
Explanation: One might expect the sequence number of the first byte in the stream to be 0, or 1. But that does not happen in TCP, Instead, the sender has to choose an Initial Sequence Number (ISN), which is basically a random 32 bit sequence of 0's and 1's, during the connection handshake.

10. The value of acknowledgement field in a segment defines _____
a) sequence number of the byte received previously
b) total number of bytes to receive
c) sequence number of the next byte to be received

d) sequence of zeros and ones
Answer: c
Explanation: The acknowledgement field in a segment defines the sequence number of the byte which is to be received next i.e. sequence number of byte that the sender should transmit next

"IPv4".

1. Which of the following is not applicable for IP?
a) Error reporting
b) Handle addressing conventions
c) Datagram format
d) Packet handling conventions
Answer: a
Explanation: The Internet Protocol is the networking protocol which establishes the internet by relaying datagrams across network boundaries. ICMP is a supporting protocol for IP which handles the Error Reporting functionality.

2. Which of the following field in IPv4 datagram is not related to fragmentation?
a) Flags
b) Offset
c) TOS
d) Identifier
Answer: c
Explanation: TOS-type of service identifies the type of packets. It is not related to fragmentation but is used to request specific treatment such as high throughput, high reliability or low latency for the IP packet depending upon the type of service it belongs to.

3. The TTL field has value 10. How many routers (max) can process this datagram?
a) 11
b) 5
c) 10
d) 1

Answer: c

Explanation: TTL stands for Time to Live. This field specifies the life of the IP packet based on the number of hops it makes (Number of routers it goes through). TTL field is decremented by one each time the datagram is processed by a router. When the value is 0, the packet is automatically destroyed.

4. If the value in protocol field is 17, the transport layer protocol used is _____
a) TCP
b) UDP
c) ICMP
d) IGMP
View Answer

Answer: b

Explanation: The protocol field enables the demultiplexing feature so that the IP protocol can be used to carry payloads of more than one protocol type. Its most used values are 17 and 6 for UDP and TCP respectively. ICMP and IGMP are network layer protocols.

5. The data field cannot carry which of the following?
a) TCP segment
b) UDP segment
c) ICMP messages
d) SMTP messages
View Answer

Answer: c

Explanation: Data field usually has transport layer segments, but it can also carry ICMP messages. SMTP is an application layer protocol. First it must go through the transport layer to be converted into TCP segments and then it can be inserted into IP packets.

6. What should be the flag value to indicate the last fragment?
a) 0
b) 1
c) TTl value
d) Protocol field value
View Answer

Answer: a

Explanation: The Flag field in the IP header is used to control and identify the

fragments. It contains three bits: reserved, don't fragment and more fragments. If the more fragments bit is 0, it means that the fragment is the last fragment.

7. Which of these is not applicable for IP protocol?
a) is connectionless
b) offer reliable service
c) offer unreliable service
d) does not offer error reporting
View Answer
Answer: b
Explanation: IP does not provide reliable delivery service for the data. It's dependent upon the transport layer protocols like TCP to offer reliability.

8. Which of the following demerits does Fragmentation have?
a) complicates routers
b) open to DOS attack
c) overlapping of fragments.
d) all of the mentioned
View Answer
Answer: d
Explanation: Fragmentation makes the implementation of the IP protocol complex and can also be exploited by attackers to create a DOS attack such as a teardrop attack. Fragmentation won't be required if the transport layer protocols perform wise segmentation.

9. Which field helps to check rearrangement of the fragments?
a) offset
b) flag
c) ttl
d) identifer
View Answer
Answer: a
Explanation: The Fragment Offset field specifies where the fragment fits in the original datagram. The offset of the first fragment will always be 0. The size of the field (13 bits) is 3-bits shorter than the size of the total length field (16 bits).

"IPv6".

1. The size of an IP address in IPv6 is _____
a) 4 bytes
b) 128 bits
c) 8 bytes
d) 100 bits
View Answer
Answer: b
Explanation: An IPv6 address is 128 bits long. Therefore, 2128 i.e. 340 undecillion addresses are possible in IPv6. IPv4 has only 4 billion possible addresses and IPv6 would be a brilliant alternative in case IPv4 runs out of possible new addresses.

2. The header length of an IPv6 datagram is _____
a) 10bytes
b) 25bytes
c) 30bytes
d) 40bytes
View Answer
Answer: d
Explanation: IPv6 datagram has fixed header length of 40bytes, which results in faster processing of the datagram. There is one fixed header and optional headers which may or may not exist. The fixed header contains the mandatory essential information about the packet while the optional headers contain the optional "not that necessary" information.

3. In the IPv6 header, the traffic class field is similar to which field in the IPv4 header?
a) Fragmentation field
b) Fast-switching
c) ToS field
d) Option field
View Answer
Answer: c
Explanation: The traffic class field is used to specify the priority of the IP packet which is a similar functionality to the Type of Service field in the IPv4 header. It's an 8-bit field and its values are not defined in the RFC 2460.

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4. IPv6 does not use _____ type of address.
a) broadcast
b) multicast

c) anycast
d) unicast
View Answer
Answer: a
Explanation: There is no concept of broadcast address in IPv6. Instead, there is an anycast address in IPv6 which allows sending messages to a group of devices but not all devices in a network. Anycast address is not standardized in IPv4.

5. Which among the following features is present in IPv6 but not in IPv4?
a) Fragmentation
b) Header checksum
c) Options
d) Anycast address
View Answer
Answer: d
Explanation: There is an anycast address in IPv6 which allows sending messages to a group of devices but not all devices in a network. Anycast address is not standardized in IPv4.

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6. The _____ field determines the lifetime of IPv6 datagram
a) Hop limit
b) TTL
c) Next header
d) Type of traffic
View Answer
Answer: a
Explanation: The Hop limit value is decremented by one by a router when the datagram is forwarded by the router. When the value becomes zero the datagram is discarded. The field is 8-bits wide, so an IPv6 packet can live up to 255 router hops only.

7. Dual-stack approach refers to _____
a) implementing Ipv4 with 2 stacks
b) implementing Ipv6 with 2 stacks
c) node has both IPv4 and IPv6 support
d) implementing a MAC address with 2 stacks
View Answer
Answer: c
Explanation: Dual-stack is one of the approaches used to support IPv6 in already existing systems. ISPs are using it as a method to transfer from IPv4 to IPv6 completely eventually due to the lower number of possible available addresses in IPv4.

8. Suppose two IPv6 nodes want to interoperate using IPv6 datagrams, but they are connected to each other by intervening IPv4 routers. The best solution here is _____
a) Use dual-stack approach
b) Tunneling
c) No solution
d) Replace the system
View Answer
Answer: b
Explanation: The IPv4 routers can form a tunnel in which at the sender's side, the IPv6 datagram is encapsulated in to IPv4, and at the receiver's side of the tunnel, the IPv4 packet is stripped and the IPv6 packet is sent to the receiver.

9. Teredo is an automatic tunneling technique. In each client the obfuscated IPv4 address is represented by bits _____
a) 96 to 127
b) 0 to 63
c) 80 to 95
d) 64 to 79
View Answer
Answer: a
Explanation: Teredo is a technique through which gives the possibility for full IPv6 network connectivity to IPv6 capable hosts which are currently on an IPv4 network. Bits 96 to 127 in the datagram represents obfuscated 1Pv4 address of the IPv4 network.