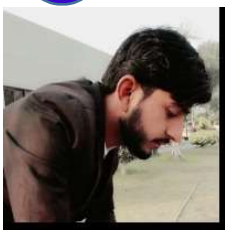
CS601-Data Communication

From: UPDATED BOOK

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Solved by JUNAID MALIK and Team



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Question No: 1

Define Three Types of Cast

Data is transported over a network by three simple methods i.e. Unicast, Broadcast, and

Multicast. So let's begin to summarize the difference between these three:

- Unicast: from one source to one destination i.e. One-to-One
- Broadcast: from one source to all possible destinations i.e. One-to-All
- Multicast: from one source to multiple destinations stating an interest in receiving the traffic i.e. One-to-Many

Question No: 2

RJ Stands for?

RJ stands for Registered Jack in Data Communication which a connector used for UTP cable.

Question No: 3

Write Full Form of Channelization Protocol

Ans:

- DMA (Frequency Division Multiple Access)
- TDMA (Time-Division Multiple Access)
- CDMA (Code Division Multiple Access)

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Question No: 4

What is ARP how does it works?

Ans:

ARP stands for Address Resolution Protocol. When you try to ping an IP address on your local network, say 10.12.2.1, if there is a value cached, ARP is not used. If the IP address is not found in the ARP table, the system will then send a broadcast packet to the network using the ARP protocol to ask "who has 10.12.2.1All system received broadcast but only intended system response with MAC address

Question No: 6

Difference between Hub, Switch and Router

Hub

Hub is commonly used to connect segments of a LAN (Local Area Network).
A hub contains multiple ports.
When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets. Hub acts as a common connection point for devices in a network.

Switch

A switch operates at the data link layer (layer 2) and sometimes the network layer (layer 3) of the OSI (Open Systems
Interconnection) Reference Model and therefore support any packet protocol.
LANs that use switches to join segments
are called switched LANs or, in the case of Ethernet networks, switched Ethernet LANs.
In networks, the switch is
the device that filters and forwards packets between LAN segments.
See more information on Network
Switch and Selection Suggestions.

Router

A router is connected to at least two networks, commonly two
LANs or WANs (Wide Area Networks) or a

LAN and its ISP.s (Internet Service Provider's) network.
The router is generally located at gateways,
the places where two or more networks connect. Using headers and
forwarding tables, router determines
the best path to forward the packets. In addition, router uses protocols such as ICMP (Internet Control Message Protocol) to communicate with each other and configures the best route between
any two hosts. In a word, router forwards data packets along with networks.

Question No: 7

Abbreviation of the following

- DLC (Data Link Control)
- FSM (Finite State Machine)
- POTS (Plain old telephone service)
- FTTC (Fiber to the Curb)

Question No: 8

HDLC Frame

Ans:

Types of HDLC Frames

- There are three types of HDLC frames. The type of frame is determined by the control field of the frame −
- I-frame − I-frames or Information frames carry user data from the network layer. They also include flow and error control information that is piggybacked on user data. The first bit of control field of I-frame is 0.
- S-frame − S-frames or Supervisory frames do not contain information field. They are used for flow and error control when piggybacking is not required. The first two bits of control field of S-frame is 10.
- U-frame − U-frames or Un-numbered frames are used for myriad miscellaneous functions, like link management. It may contain an information field, if required. The first two bits of control field of U-frame is 11.

Question No: 9

Difference between data word and code word

Ans:

- We divide our message into blocks, each of 'k' bits, called data words

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- We add ‘r’ redundant bits to each block to make the length ‘n = k + r’
- The resulting ‘n-bit’ blocks are called code words

Question No: 10

SERVICES PROVIDED BY DALA LINK

Ans:

- Framing is a point-to-point connection between two computers or devices consists of a wire in which data is transmitted as a stream of bits. Source & Destination Address
- Flow control is a technique that allows two stations working at different speeds to communicate with each other.
- Error control in data link layer is the process of detecting and correcting data frames that have been corrupted or lost during transmission.

Question No: 11

Variable Framing Techniques

- **Character-oriented framing**

  In character - oriented framing, data is transmitted as a sequence of bytes, from an 8-bit coding system like ASCII.

- **Bit-oriented framing**

  In bit-oriented framing, data is transmitted as a sequence of bits that can be interpreted in the upper layers both as text as well as multimedia data.

Question No: 12

Configurations & Transfer Modes in HDLC

Ans:

- HDLC supports two types of transfer modes, normal response mode and asynchronous balanced mode.
- Normal Response Mode (NRM) − Here, two types of stations are there, a primary station that send commands and secondary station that can respond to received commands. It is used for both point - to - point and multipoint communications.
- Asynchronous Balanced Mode (ABM) − Here, the configuration is balanced, i.e. each station can both send commands and respond to commands. It is used for only point - to - point communications.

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Question No: 13

What is CONTROLLED ACCESS and its types?

Ans:

- The stations consult one another to find which station has the right to send
- A station cannot send unless authorized by other stations
- Three controlled-access methods:
- Reservation
- Polling
- Token Passing

Question No: 14

Stop and Wait Flow Control

Ans:

- This protocol involves the following transitions –
- The sender sends a frame and waits for acknowledgment.
- Once the receiver receives the frame, it sends an acknowledgment frame back to the sender.
- On receiving the acknowledgment frame, the sender understands that the receiver is ready to accept the next frame. So it sender the next frame in queue.

Question No: 15

Which form of signal represents binary 1 and 0 by positive and negative voltage level?

Answer

In Bipolar encoding scheme, zero **level represents binary 0**, and **binary 1** is **represented** by alternating **positive and negative voltages**. If the first **1** bit is **represented** by **positive** amplitude, then the second **1** bit is **represented** by **negative voltage**, third **1** bit is **represented** by the **positive** amplitude and so on The signal represents binary 1 and 0 by positive level then the negative level is signal represents binary 0 and 1 is negative level. the Baud Rate and minimum Bandwidth for FSK signal transmitted at 3000 bps by assuming that transmission medium is in half duplex mode and carrier must be separated by 4000 Hz. Using AMI encoding scheme in digital transmission, we represent 0 by zero voltage level and represent 1 by any positive voltage level.

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Question No: 16

Distinguish between Slotted aloha and Pure aloha.

Answer

In **pure ALOHA**, whenever a station has data to send it transmits it without waiting whereas, in **slotted ALOHA** a user waits till **the** next time **slot** beings to transmit **the** data. In **pure ALOHA the** time is continuous whereas, in **Slotted ALOHA the** time is discrete and divided into slots. Jun 23, 2016 Description. **Aloha** in computer networks is an access control protocol. Versions of **Aloha** Protocol- **Pure Aloha** and **Slotted Aloha**. **Pure Aloha** in networking allows the stations to transmit the data at any time. **Slotted Aloha** Protocol allows the stations to transmit data only at the beginning of the time **slot**.

ALOHA the earliest random access method was developed in early in 1960s the distinguish between Slotted aloha and Pure aloha in the data communication its work different before the 1960 people never know the aloha after the 1960s people were know the slotted aloha and pure aloha.

Question No: 17

If we want to be able to detect 4-bit errors, what should be the minimum Hamming distance? Answer with the help of formula.

Answer

Valid code words: 2 power 8 = 256 b. Invalid code words: 2 power 10 – 2 power 8 = 768 Q10-6.

Question No: 18

If we want to be able to detect two-**bit errors what should be the minimum Hamming distance**?

Ans:

Hamming distance = s+1 Since s = 2**Hamming distance** = 2+1 = 3 Q10-8.

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Question No: 19

What is the minimum Hamming distance?

Ans:

The **minimum distance** between any two vertices is the **Hamming distance** between the two binary strings.

Question No: 20

Normally a telephone network is divided into several levels of switching offices, mention their names.

Answer

The telephone network has several levels of switching offices:

- End offices
- Tandem offices
- Regional offices

Question No: 21

If four computers are connected with wireless NIC in a LAN architecture like isolated LAN in wired network. What do we call such networks?

Answer

If four computers are connected with wireless NIC in a LAN architecture like isolated LAN in wired network. Then we call this type of networks Multicast because into the timing the four computer are connected with wireless NIC in a local area network so that we called it's a multicast network

Question No: 22

Find the Baud Rate and minimum Bandwidth for FSK signal transmitted at 3000 bps by assuming that transmission medium is in half duplex mode and carrier must be separated by 4000 Hz. Write all necessary steps, formulas a

Answer

The Baud Rate and minimum Bandwidth for FSK signal transmitted at 3000 bps by assuming that transmission medium is in half duplex mode and carrier must be

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separated by 4000 Hz During the transmission, transmitting device produces a high frequency signal which acts as a basis for the transmission. This base signal is called Analog signal

Question No: 23

Illustrate the two strategies used to avoid collision.

Answer

additional energy. This is not useful for effective collision detection.

We need to avoid collisions on wireless networks because they cannot be detected. Carrier sense multiple access with collision avoidance *(CSMAICA)* was invented for this

network. Collisions are avoided through the use of CSMAICA's three strategies: the interframe

space, the contention window, and acknowledgments, as shown in Figure 12.16.

Figure 12.16 *Timing in CSMAICA*

-Found Size:

idle l1Jillielxlp1obneinntiaalry

Question No: 24

Show how the address 47:20:1B:2E:08:EE is sent out online by filling the spaces in figure given blow.

- Hexadecimal
- Binary
- Transmitted

Answer

Show how the address 47:20:1B:2E:08:EE is sent out online by filling the spaces in figure given blow.

Hexadecimal 47:20:1B:2E:08:EE

Binary 47 20 1B 2E 08 EE

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Transmitted 47: 20: 1B : 2E: 08: EE

At the data-link layer, Simple protocol is designed to handle both flow and error control, but communication is one frame at a time.During the transmission, transmitting device produces a high frequency signal which acts as a basis for the transmission. This base signal is called Analog signal

Question No: 25

A communication system is encoding 2-bit data words into 3-bit code words for error detection using even-parity encoding.

I. If data word is '01', what will be the code word for transmission?

II. If communication system suffers a 3-bit burst error and all the bits are damaged; what will be the code word received at the other end?

III. With the effect of burst error; will this code word be accepted or rejected by the receiver? Mention the reason.

Answer

A communication system is encoding 2-bit data words into 3-bit code words for error detection using even-parity encoding. If data word is '01', They will be the code word for transmission is <01>. If communication system suffers a 3-bit burst error and all the bits are damaged; They will be the code word received at the other end is 6-bit. With the effect of burst error; will this code word be accepted or rejected by the receiver? The reason of the code word is all the process will b hide system for FEC using XOR operation, we divide a packet into N chunks, and need to send N chunks to the receiver side's a technique called, compounding High-and-Low Resolution Packets, the low-resolution section in the first packet is Checksum.

Question No: 26

State the reasons for the Looping problem in a switch along with appropriate solutions based on logical reasoning.

Answer

Loop Problem Transparent bridges work fine as long as there are no redundant

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bridges in the system. Systems administrators, however, like to have redundant bridges (more than one bridge between a pair of LANs) to make the system more reliable. If a bridge fails, another bridge takes over until the failed one is repaired or replaced. Redundancy can create loops in the system, which is very undesirable.

Switching loop: A **switching loop** or bridge **loop** occurs in computer networks when there is more than one Layer 2 (OSI model) path between two endpoints (e.g. multiple connections between two network **switches** or two ports on the same **switch** connected to each other).

Question No: 27

Name the three wave propagation methods for communication through unguided media.

Answer

The three wave propagation methods for communication through unguided media.

- cell phone
- mail
- internet

Question No: 28

Enlist three channelization protocols.

Answer

Enlist three channelization protocols.

- Aloha, CSMA/CD and CSMA/CA
- Reservation, Polling and Token
- FDMA, TDMA, and CDMA

Question No: 29

If we want to be able to detect 4-bit errors, what should be the minimum Hamming distance? Answer with the help of formula.

Answer

The Hamming distance between two pair of words (101101, 001011) is

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- 101101
- 001011

The answer is hamming distance is 3

The PAP is a simple authentication procedure with a twostep process, which uses Two type(s) of packet(s) for authentication. In CRC error detection, all the data words are added using 1's complement to calculate a sum, which is then complemented and transmitted with the data words. The Network layer is responsible for the creation and delivery of a frame to another node, along the link.

Question No: 30

Give the names for the following two carriers in telephone system under LATA;

What is the name of carrier that handles Intra-LATA?

What is the name of carrier that handles Inter-LATA?

Answer

The names for the following two carriers in telephone system under LATA;

LOCAL ACESS TRANSPORT AREA

the name of carrier that handles Intra-LATA is the external access transport area

the name of carrier that handles Inter-LATA internal access transport area

Question No: 31

Give the name of the characteristic in which signal gets degraded during its propagation and full strength of signal is not received at receiver.

Answer

The name of the characteristic in which signal gets degraded during its propagation and full strength of signal is not received at receiver. is a signal where it is being received by receiver after reflection from different intermediate objects (Building, iron polls, walls) is called Interference

Question No: 32

Two stations (M and N) are connected through a circuit switched network. If station M wants to transfer some data to station N; a dedicated link is used to

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transmit data. Write the names of five stages involved in this process for successful communication.

Answer

Two stations (M and N) are connected through a circuit switched network. The station M wants to transfer some data to station N and dedicated link is used to transmit data to five stages involved in this process for successful communication.

- Radio
- mobile LAN
- WAN
- INTERNET
- FAX
- MASSAGE

Question No: 33

Name and describe any **two** controlled-access methods.

Answer

- LAN
- WAN

WAN, we search all the data into the wan when we use the browser and we find some data into the internet world we fined easily everything just open and search the problem that is why we used the WAN

LAN in the lane when the router connects with the wire into the LAN then the system is start to working and we use the LAN

Question No: 34

A communication system is encoding 2-bit data words into 3-bit code words for error detection using even-parity encoding.

I. If data word is '01', what will be the code word for transmission?

II. If communication system suffers a 3-bit burst error and all the bits are damaged; what will be the code word received at the other end?

III. With the effect of burst error; will this code word be accepted or rejected by the receiver? Mention the reason.

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Answer

A communication system is encoding 2-bit data words into 3-bit code words for error detection using even-parity encoding.

Question No: 35

If data word is '01', what will be the code word for transmission?

The code word for transmission is 0 If communication system suffers a 3-bit burst error and all the bits are damaged; what will be the code word received at the other end the code word received at the other end is error with the effect of burst error; will this code word be accepted or rejected by the receiver the code word is rejected by the receiver because the code word is effect of burst error that's why

Question No: 35

Telephone system works in multiple small metropolitan area which are called LATA, answer the questions given below;

- Which name is given to services that are offered by telephone companies inside a LATA?
- And, what name shall be given to the services that are offered between LATAs?

Answer

Telephone system works in multiple small metropolitan area which are called LATA, answer the questions given below; Which name is given to services that are offered by telephone companies inside a LATA The name of the giving the companies is telecom local access transport area And, the name shall be given to the services that are offered between

- LATAs is the Aloha, CSMA/CD and CSMA/CA
- Reservation, Polling and Token
- FDMA, TDMA, and CDMA

Question No: 36

How does CSMA/CD technique get impacted in wireless LAN by the following factors?

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- Power at a host
- Hidden station

Answer

How does CSMA/CD technique get impacted in wireless LAN by the following factors?

Power at a host

The power at the host is the router openly in the room and the area covered the signal in the area and the user use easily some of the person us the wire to the router The PAP is a simple authentication procedure with a twostep process, which uses Two type(s) of packet(s) for authentication.

Cyclic codes are special linear block codes in which, rotation of a code word results in another code word.

Hidden station

The hidden station is using the LAN it is difficult to use the LAN because ether power of the station is hidden and the proper working but if the problem create then it was a difficult to use In CRC error detection, all the data words are added using 1's complement to calculate a sum, which is then complemented and transmitted with the data words. The Network layer is responsible for the creation and delivery of a frame to another node, along the link.

Question No: 37

what are the categories of multiplexing?

Ans:

There are three categories of multiplexing

- FDM
- TDM
- WDM

Have a two other categories

- Synchronous
- asyrounce

Question No: 38

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What kind of error is undetectable by the checksum?
Ans:
Error detection method used by the higher layers like VRC, LRC, CRC, checksum is also based on the concept of redundancy

Question No: 39
What are the basic purpose of routers?

Routers connect computers and other devices to the Internet. A router acts as a dispatcher, choosing the best route for your information to travel. It connects your business to the world, protects information from security threats, and can even decide which computers get priority over others.

Question No: 40
Why we need a Null Modem?
Ans:

Null modem is a communication method to directly connect two DTEs (computer, terminal, printer, etc.) using an RS-232 serial cable. With a null modem connection, the transmit and receive lines are cross-linked. Depending on the purpose, sometimes also one or more handshake lines are cross-linked.

Question No: 41

What are properties of signals?

Ans:

- Capable of being propagated over TX.
- Medium, Interpretable as data at the recieve

Question No: 42

Coaxial cable designs are categorized by their Radio government (RG) ratings; you are requiredto match the following RG ratings with their respective uses.

Category	Use
RG-11	Used for TV
RG-59	Thin Ethernet
RG-58	Thick Ethernet

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Ans:

Category	Use
RG-11	Thick Ethernet
RG-59	Used for TV
RG-58	Thin Ethernet

Question No: 43

Give Advantages of using VLAN on layer 3 switches.

Ans:

- VLANs enable logical grouping of end-stations that are physically dispersed on a network.
- VLANs reduce the need to have routers deployed on a network to contain broadcast traffic.
- Flooding of a packet is limited to the switch ports that belong to a VLAN.
- Confinement of broadcast domains on a network significantly reduces traffic
- Cost and Time Reduction
- Creating virtual Workgroups
- Security

Question No: 44

Name and describe any **two** controlled-access methods.

Answer

The three popular controlled-access methods are as follows.

- Reservation: In the reservation method, a station needs to make a reservation before sendingdata.
- Polling: Polling works with topologies in which one device is designated as a primary stationand the other devices are secondary stations. ...
- Token Passing: In the token-passing method, the stations in a network are organized in a logicalring

Question No: 45

Consider a scenario where five computers are connected to each other in a wired LAN through switch.How can this wired LAN be converted to a wireless LAN architecture?

Ans:

According to given scenario, Wireless LANs can be replaced this. Wireless LANs are those Local Area Networks that use high frequency radio waves

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instead of cables for connecting the devices in LAN. Users connected by WLANs can move around within the area of network coverage. Most WLANs are based upon the standard IEEE 802.11 or Wi-Fi.

IEEE 802.11 Architecture

The components of an IEEE 802.11 architecture are as follows

1. Stations (STA) − Stations comprise all devices and equipment's that are connected to the wireless LAN. A station can be of two types:

a. Wireless Access Points (WAP) − WAPs or simply access points (AP) are generally wireless routers that form the base stations or access.

b. Client. − Clients are workstations, computers, laptops, printers, smartphones, etc.

Each station has a wireless network interface controller.

2. Basic Service Set (BSS) −A basic service set is a group of stations communicating at physical layer level. BSS can be of two categories depending upon mode of operation.

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