بسمِ اللہ الرَّحمٰن الرَّحیم

CS601

Data Communication

Final Term Preparation

Most Important Questions Final Term

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Short Question

Question No 1

What are the advantages of a multipoint connection over a point-to-point connection?

Answer:

Point-to-point connection is limited to two devices, where else more than two devices share a single link in multipoint connection. Multipoint connection can be used for fail-over and reliability.

Question No 2

What's the name of the telephone service in which there is no need of dialing.

Answer:

DSS (digital data service) is the telephone service in which there is no need of dialing.

Question No 4

Which type of frames is present in BSC frames?

Answer

There are two types of frames that are present in BSC.

1. *Control Frames and*
2. *Data Frames*

Question No 5

What methods of line discipline are used for peer to peer and primary secondary communication?

Answer:

Line discipline is done in two ways:

1. ***ENQ/ACK (Enquiry Acknowledgement)***

This is used for peer to peer communication.

2. ***Poll/ Select***

This method is used for primary secondary communication.

Question No 6

What are properties of signals?

Answer:

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

Question No 7

Whether in Asynchronous or Synchronous TDM, addressing is used?

Answer:

Addressing is used only in Asynchronous TDM.

Question No 8

What is the basic purpose of Router?

Answer:

Basic purpose of Router:

A router is a device that extracts the destination of a packet it receives, selects the best path to that destination, and forwards data packets to the next device along this path. They connect networks together; a LAN to a WAN for example, to access the Internet.

Question No 9

Why we need a Null Modem?

Answer:

A null modem provide DTA –DTE interface w/o DCEs

Question No 10

What are the categories of multiplexing?

Answer:

There are three catogaries of multiplxing

FDM

TDM

Have a two other catagories

Synchronous and asyrouncN

WDM

Question No 11

What are the three purposes of control frames at data link layer?

Answer:

Control frames serve 3 purposes:

Establishing Connections

Maintaining Flow and Error Control during Data Transmission

Terminating Connection

Question No 12

How Bit Rate & Baud rate are related?

Answer:

Bit rate equals the baud rate times the no. of bits represented by each signal unit.

The baud rate equals the bit rate divided by the no. of bits represented by each signal shift.

Bit rate is always greater than or equal to Baud rate

Question No 13

Following abbreviations stands for what?

Answer:

1. *ARP: Address Resolution Protocol*
2. *RARP: Reverse Address Resolution Protocol*
3. *ICMP: Internet Control Message Protocol*

Question No 14

Differentiate between Polling and Selecting.

Answer:

If the primary wants to receive data, it asks the second-arise if they have anything to send, this is called Polling

If the primary wants to send data, it tells the target secondary to get ready to receive, This function is called Selecting.

Question No 15

What is hybrid topology?

Answer:

Hybrid topology is a kind of topology, In which Several topologies combined in a larger topology

Question No 16

What is combined station of HDLC?

Answer:

A combined station is one of a set of connected peer devices programmed to behave either as a primary or as a secondary depending on the nature and the direction of the transmission.

Question No 17

What kind of error is undetectable by the checksum?

Answer:

Error is invisible if a bit inversion is balanced by an opposite bit inversion in the corresponding digit of another segment

Question No 18

What's the name of the telephone service in which there is no need of dialing?

Answer:

In Analog Leased Service there is no need of dialing

Question No 19

What is the difference between a unicast, multicast, and broadcast address? [3]

Answer:

Broadcast*: transmitting a packet that will be received by every device on the network*

Unicast*: the sending of information packets to a single destination*

Multicast*: delivery of information to a group of destinations.*

Question No 20

What are the three types of Guided Media?

Answer:

1. *Coaxial cable*
2. *Twisted-pair cable*
3. *Fiber optic cable.*

Question No 21

What is the formula to calculate the number of redundancy bits required to correct a bit error in agiven number of data bits?

Answer:

Messages (frames) consist of m data (message) bits, yielding an n=(m+r)-bit codeword.

Question No 22

What is R G rating of coaxial cable?

Answer:-

Different coaxial cable designs are categorized by their Radio government (RG) ratings

Each cable defined by RG rating is adapted for a specialized function:

RG-8

Used in Thick Ethernet

RG-9

Used in Thick Ethernet

RG-11

Used in Thick Ethernet

RG-58

Used in Thin Ethernet

RG-59

Used for TV

Question No 23

What are the advantages of thin Ethernet?

Answer:

The advantages of thin Ethernet are:

1. *Reduced cost*
2. *Ease of installation*

Because the cable is lighter weight and more flexible than that used in Thick net

Question No 24

Which one has more overhead, a repeater or a bridge? Explain your answer.

Answer:

A bridge has more overhead than a repeater. A bridge processes the packet at two layers; a repeater processes a frame at only one layer. A bridge needs to search a table and find the forwarding port as well as to regenerate the signal; a repeater only regenerates the signal. In other words, a bridge is also a repeater (and more); a repeater is not a bridge

Question No 25

Differentiate internet and the internet?

Answer:

INTERNET

- *An internet is a generic term used to mean an interconnection of individual networks*
- *To create an internet, we need networking devices called routers and gateways*
- *An internet is different from the Internet*
- *Internet is the name of a specific worldwide network*

Question No 26

Geosynchronous Satellite?

Answer*:*

- *Line of sight propagation requires the sending and receiving antennas must be locked into each other*
- *To ensure continuous communication, satellites must move with the same speed as earth. So that they seem fixes w.r.t earth*
- *These satellites are called Geosynchronous Satellites*

Question No 27

What is Interleaving?

Answer

Synchronous TDM is considered as a very fast rotating switch. When this switch opens in front of a device, the device has the opportunity to send a specific amount of data on to the path. The switch moves from device to device at a constant rate and in a fixed order. This process is called INTERLEAVING. Interleaving can be done by BITS, BYTES or by any other DATA UNIT

Question No 28

What is DSU in terms of digital services?

Answer:

DSU (Digital service unit) changes the rate of digital data created by the subscriber's device to 56 Kbps and encodes it in the format used by service provider. It used in dialing process and is more expensive than MODEM. But it has better speed, better quality and less susceptibility to noise.

Question No 29

Which architecture of Ethernet developed by ITU_T and ANSI?

Answer:

FDDI (Fiber Distributed Data Interface)architecture of Ethernet developed by ITU_T and ANSI.

Question No 30

What is a spike in noise term?

Answer

Spike is a signal with high energy in a very short period of time that comes from power lines, lightening etc,

Question No 31

What do you know about ITU-T Modems?

Answer:

ITU-T modem :

V-series: Today's most popular modem standards bell modem compatible:

V.21/22/23/26/27/29

Question No 32

Following abbreviations stands for what

Answer:

ARP……. (Address Resolution Protocol)

RARP…… (Reverse Address Resolution Protocol)

ICMP …… (Internet Control Message Protocol)

Question No 33

Write names of Link Access Protocols developed by ITU-T?

Answer:

LAPs, LAPB, LAPD, LAPM, LAPZ etc. all based on HDLC

Question No 34

Write the names of different types of noise in the medium?3

Answer:

Thermal Noise

Induced Noise

Crosstalk

Impulse Noise

Question No 35

Write down some disadvantages of star topology.

Answer:

Although Cabling required is far less than Mesh still each node must be connected to a Hub , so Cabling is still much more

Question No 36

What are the two major classes of synchronous protocols at data link layer?

Answer:

Character – Oriented Protocols

Bit – Oriented Protocols

Question No 37

Whether Hamming code is the technique used for error detection or error correction?2

Answer:

Hamming code is the technique used for error correction

Question No 38

Define Multiplexing? What is its advantage?2

Answer:

Set of techniques that allows the simultaneous transmission of multiple signals across a single data link it allows multiple users to share total capacity of a Transmission Medium.

Question No 39

What is the purpose of dual ring?

Answer:

Unidirectional traffic movement is overcome by dual ring technology.

Question No 40

Which modem was first developed commercially in 1970?

Answer:

Bell modems

Question No 41

What is the difference between FDM and TDM

Answer:

1) *FDM-Frequency division multiplexing where as TDM mean Time division multiplexing.*
2) *In FDM spectrum is divided into frequency whereas in TDM divided into time slot.*
3) *FDM is used in 1st generation analog system whereas TDM is used in 2nd generation analog system.*

Question No 42

What does the CRC generator append to data unit?

Answer:

Appending it to the end of the data must make the resulting bit sequence exactly divisible by the divisor

Question No 43

How much bandwidth for modem is required in case of FSK?

Answer:

BW required for FSK is equal to the Baud rate of the signal plus the frequency shift.Because of the limitations of voice-grade telephone lines, these modems are restricted to a bandwidth of about 3 kHz

Question No 44

What is even parity generator in VRC error detection mechanism?

Answer:

Even parity generator counts the 1‟s and appends the parity bit (1) to the end.

Question No 45

What is the difference between angle of incident and angle of reflection?

Answer:

The difference between them is that Angle of refraction passes from less dense to denser medium whereas angle of incidence passes from more dense to less dense medium.

Question No 46

What is daisy chaining in 1Base 5 star Lan?

Answer:

Slower speed in star lan can be increase by the use of DAISY CHAINING.

Question No 47

What is the responsibility of Application layer?

Answer:

Enables the user either human or software to access the network it provides user interface and support for the services such as Electronic mail, Remote File access and transfer, Shared Database Management and other services

Question No 48

What is critical angle?

Answer:

We have a beam of light moving from a more dense to a less dense medium. We gradually increase the angle of incidence measured from vertical axis. As angle of incidence increases, so does the angle of refraction. The angle at which refracted line lies on the horizontal axis is called Critical Angle

Question No 49

Whether VRC error detection method is used for single bit error or burst error.

Answer

VRC can detect all single bit errors can also detect Burst errors as long as the total number of bits changed is ODD

Question No 50

Which modem was first developed commercially in 1970?

Answer:

Bell modems

–First commercial modems by Bell Telephone Co.

–Developed in early 1970s

Question No 51

Consider a major telecom company using RZ encoding for its signals conversion. What will be the major problem faced by using such type of encoding?

Answer:

Any time, data contains long strings of 1's or 0's, Rx can loose its timing. The only problem with RZ encoding is that it requires two signal changes to encode one bit and therefore occupies more BANDWIDTH

Long Question

Question No 1

Write the types transmission noise

Answer:

Thermal Noise: Due to random originally sent by TX

Induced Noise: Comes from sources like Motors and Appliances

Crosstalk: Effect of one wire on another

Impulse Noise: Spike (A signal with high energy in a very short period of timepower lines, lightening etc.

Question No 2

What is power bandwidth

Answer:

The power bandwidth of an amplifier is sometimes taken as the frequency range (or, rarely, the upper frequency limit) for which the rated power output of an amplifier can be maintained (without excessive distortion) to at least half of the full rated power.

Question No 3

What is the difference between guided and unguided media?

Answer:

Guided Media are those media that provide a conduit from one device to another. Guided transmission Media uses a "cabling" system that guides the data signals along a specific path while unguided Transmission Media consists of a means for the data signals to travel but nothing to guide them along a specific path. It passes through a vacuum; it is independent of a physical pathway.

Question No 4

Tree topology advantages

Answer:

- *Because of Secondary Hub, More devices can be attached to a Central Hub and therefore increase the distance a signal can travel*
- *Enables Differentiated Services: Allows to prioritize communication, e.g. computers attached to one secondary hub can be given priority over others*
- *Therefore, TIME SENSITIVE data will not have to wait for access to the network*
- *Rest of the advantages are almost the same as STAR*

Question No 5

What is Frequency division multiplexing ?

Answer:

Frequency division multiplexing (FDM)

- *An analog technique that can be applied when BW of the link is greater than the combined BW of the signals to be TX*
- *Signals generated by each sending device modulate difference carrier frequencies*
- *These modulated signals are then combined into a single Composite signal that can be transported by the link*
- *Carrier frequencies are separated by enough BW to accommodate the modulated signal*
- *These BW ranges are the channels through which the various signals travel*

Question No 6

What is stop and wait ARQ in error control ?

Answer:

Stop-and-Wait is an extended form of flow control to include retransmission of data in case of Lost or damaged frames.

There are four main features added in it.

1. *Sending device keeps a copy of the last frame transmitted until it receives the ACK for that frame.*
2. *Both data and ACK frames are numbered 0 and 1 alternately.*
3. *A data 0 frame is acknowledged by a ACK 1 frame indicating that the receiver has received data 0 and is now expecting data 1 .*
4. *For retransmission to work, 4 features are added to the basic flow control mechanism.*

Question No 7

What is Interleaving ?

Answer

Synchronous TDM is considered as a very fast rotating switch. When this switch opens in front of a device, the device has the opportunity to send a specific amount of data on to the path.

The switch moves from device to device at a constant rate and in a fixed order. This process is called

INTERLEAVING. Interleaving can be done by BITS, BYTES or by any other DATA UNIT

Question No 8

Which one has more overhead, a repeater or a bridge? Explain your answer.

Answer:

A bridge has more overhead than a repeater. A bridge processes the packet at two layers; a repeater processes a frame at only one layer. A bridge needs to search a table and find the forwarding port as well as to regenerate the signal; a repeater only regenerates the signal. In other words, a bridge is also a repeater (and more); a repeater is not a bridge

Question No 9

Define high frequency [HF] and super high frequency [SHF], which devices uses these fequencies

Answer:

High frequency.

HF uses ionospheric propagation. These frequencies move into the ionosphere where the density difference reflects them back on earth, it is used for Citizen's Band Radio, International Broadcasting, Military Communication, Telephone, Telegraph and Fax

Super high frequency.

SHF waves are TX using mostly line-of-sight and some Space propagation.

It is used for Terrestrial and Satellite Microwave and Radar Communication devices.

Question No 10

Write all steps of checksum method.

Answer:

- *The sender subdivides data units into equal segments of 'n' bits(16 bits)*
- *These segments are added together using one's complement*
- *The total (sum) is then complemented and appended to the end of the original data unit as redundancy bits called CHECKSUM*
- *The extended data unit is transmitted across the network*
- *The receiver subdivides data unit as above and adds all segments together and complement the result*
- *If the intended data unit is intact, total value found by adding the data segments and the checksum field should be zero o If the result is not zero, the packet contains an error & the receiver rejects it*

Question No 11

Why addressing is required in Poll / Select method and not required in ENQ/ACK method?

Answer:

Addressing is required in Poll / Select method as it is a not point-to-point configuration, For the primary device in a multipoint topology to be able to identify and communicate with a specific secondary device, there must be some addressing, while ENQ/ACK method is a point-to-point method and for point-to-point configuration, there is no need for addressing.

Question No 12

Why do we need Inverse Multiplexing?

Answer:

An organization wants to send data, voice and video each of which requires a different data rate

- *To send voice it needs 64Kbps,*
- *To send data, it needs 128 Kbps link*
- *To send video it may need 1.544 Mbps link*
- *It can lease a 1.544 Mbps line from a common carrier and only use it fully for sometime*
- *Or it can lease several separate channels of lower data rates*
- *Voice can be sent over any of these channels*
- *Data & Video can be broken into smaller portions using Inverse Multiplexing and TX*

Question No 13

Describe method of checksum briefly?

Answer:

- *The sender subdivides data units into equal segments of 'n' bits(16 bits)*
- *These segments are added together using one's complement*
- *The total (sum) is then complemented and appended to the end of the original data unit as redundancy bits called CHECKSUM*
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Question No 14

T lines are designed for Digital data how they can be used for Analog Transmission?

Answer:

- *DS-1 requires 8 Kbps of overhead*
- *To understand this overhead, let's examine format of a 24-voice channel frame.*
- *Frame used on T-1 line is usually 193 bits divided into 24 slots of 8 bits each + 1 bit for Synchronization (24*8+1=193)*
- *24 segments are interleaved in one frame*
- *If a T-1 carries 8000 frames, the data rate is 1.544 Mbps (193 * 8000=1.544 Mbps) which is capacity of the line*

Question No 15

How are lost acknowledgment and a lost frame handled at the sender site?

Answer:

A lost or damaged frame is handled in the same way by the receiver; when the receives a damaged frame, it discards it, which essentially means the frame is lost. The

Receiver remains silent about a lost frame and keeps its value of R.

Question No 16

Explain Protocol Data Unit (PDU)?

Answer:

Protocol Data Unit (PDU)

The data unit in the LLC level is called the Protocol Data unit (PDU)

The PDU contains 4 fields familiar from HDLC:

–A destination service access point (DSAP)

–A source service access point (SSAP)

–A control field

–An Information field

Question No 17

Write down the function of Primary-Secondary communication in line discipline.

Answer:

1. *Poll method works with topologies where one device is designed as a Primary station and the other devices are Secondary stations*
2. *The primary device controls the link and the secondary device follow sits instruction*
3. *It is up to the primary to determine which device is allowed to use the channel at a given time.*
4. *The primary therefore is always the initiator of the a session*
5. *Whenever a multipoint link consists of a primary device and multiple secondary devices using a single TX line , all exchanges must be made through the primary device even when the ultimate destination is a secondary device*