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CN- Sessional Paper

Q-1 a) Explain the difference b/w an internet draft and proposed standard?

Sol: Internet draft is a working document (a work in progress) with no official status and 16 month lifetime. Upon recommendation from the internet authorities, a draft may be published as a request for comment (RFC).

Proposed standard is a specification that is stable, well understood and of sufficient interest to the internet community. At this level, it is usually tested and implemented by sensual dlf groups.

b) Explain the factors that determine whether the communication system is LAN or WAN.

Sol:

FACTORS	LAN	WAN
① Size	→ less than 2 m	→ worldwide
② Speed	→ higher than WAN	→ slower than LAN
③ Ownership	→ private	→ private / public
④ Congestion	→ less	→ more
⑤ Propogation delay	→ short	→ long
⑥ Transmission media	→ Coaxial / UTP	→ PSTN / Satellite

c) In a ring topology, what happens if one station is unplugged?

Sol: Since the flow of data in ring topology is unidirectional so if one station is unplugged, it disables the entire network and the ring can stop functioning.

d) Differentiate b/w guided and unguided transmission media?

Sol:

Guided	Unguided
→ The signal energy propagates through wires.	→ The signal energy propogates through air
→ It is used for point-to-point communication.	→ It is suited for radio broadcasting in all directions.
→ Signals are in the form of voltage, current or photons.	→ Signals are in the form of electromagnetic waves.
→ Discreate n/w topologies are formed by guided media.	→ Continous n/w topologies are formed by the unguided media.
→ Ex: twisted pair cable, coaxial, fibre optics.	→ microwave / radio links or infrared light.

e.) What is character Stuffing?

Sol: Data link layer divides the stream of data from physical layer into frames. In order to mark the end of frame, a special flag byte is used but if it matches the message pattern, it leads to ambiguity.

To prevent this a special byte called as escape character is stuffed before every byte with same pattern as the flag.

Q2 a) If the frame is 11010111 and the generator is $x^4 + x + 1$ what should be transmitted frame generated by CRC.

Sol:

Divisor : 10011

Divided : 11010111

```
10011 ) 11010111 ( 11011
        10011
        -----
        10011
        10011
        -----
        00000
        00000
        -----
        00001
        10011
        -----
        10010
        10011
        -----
        10110
        10011
        -----
        00101
```

Ans⇒ 11010101 1001

b.) How does a single bit error differs from burst error ?

Sol: Bit error means only a single bit is changed from 0 to 1 or vice-versa. There is error only in a single bit.

Burst error means 2 or more bits can contain errors.

c) Differentiate b/w star & tree topology ?

Sol:

STAR	TREE
→ Nodes are connected to central node known as hub.	→ every node is connected to its left and right side node.
→ Cost is high.	→ Cost is low.
→ Only hub is a failure point	→ Every node is a failure point.
→ Data moves from node to hub then from hub to destination node.	→ Data moves only in one direction.

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Q-4. a.) A 7-bit hamming code is received as 0010110. Find out whether code is correct or node. If not, correct the code.

Sol:

D_7	D_6	D_5	P_4	D_3	P_2	P_1
0	0	1	0	1	1	0

For even parity:

$P_1 = (D_3\ D_5\ D_7) = 110$ $\quad \boxed{P_1 = 0}$ ✓

$P_2 = (D_3\ D_6\ D_7) = 100$ $\quad \boxed{P_2 = 0}$ ✓

$P_4 = (D_5\ D_6\ D_7) = 100$ (Error in P_4)

$\therefore$ Error at bit $= P_4 P_2 P_1$
$= (100)_2$
$= (4)_{10}$

So, Error is present in the 4th bit.

Correct code $\Rightarrow$ 0011110

b.) 500 frames per sec.

Sol:

Transmission time of a frame = $\frac{200}{200}$ = 1 ms

$G = 1/2$

∴ Throughput in case of slotted ALOHA.

$\Rightarrow G \times e^{-G}$

$= 0.303$

$= 30.3\ \%$

• Throughput in 500 frames is = 500×0.303

$= 151$ frames.

∴ Throughput of PURE ALOHA:

$\Rightarrow G \times e^{-2G}$

$\Rightarrow 1/2 \times e^{-2(1/2)}$

$\Rightarrow 18.4\%$

• Throughput for 500 frames → $0.184 * 500$

$\Rightarrow 92$ frames

(ii) 250 frames per sec.

Sol:

$G = 1/4$

∴ Slotted ALOHA $= G \times e^{-G}$

$= 0.195 = 19.5\%$

- For 250 frames $= 250 \times 0.195$

$= 49$ frames.

∴ PURE ALOHA $= G \times e^{-2G}$

$= 0.152 = 15.2\%$

- For 250 frames $= 250 \times 0.152 = 38$ frames.

c) Differentiate b/w synchronous & statistical TDM ?

Sol:

Synchronous	Statistical
① Data of each i/p connection is divided into units & each i/p occupies one time slot.	① Slots are allocated dynamically. Slot is allowed only if it has data to send.
② Synchronization bits are added at the begining of each frame.	② No need of synchronization bits.
③ It carries only data	③ It carries both data & address of destination
④ The no. of slots in each	④ The no. of slots in each.

frame are equal to no. of output lines.	frames are less than no. of i/p lines.

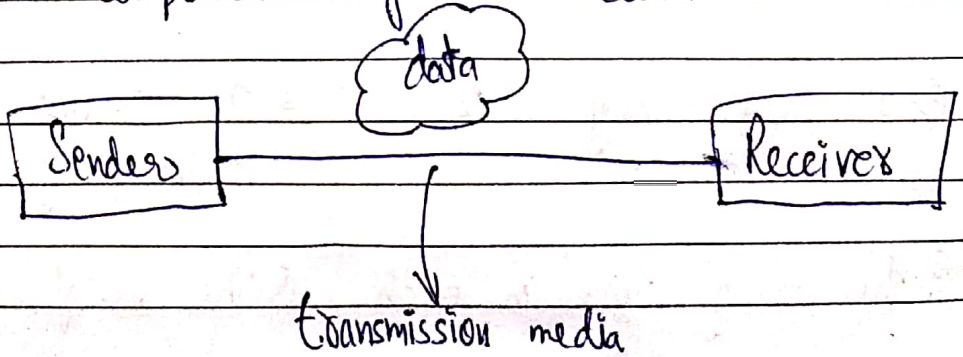
Q-3 a) Differentiate b/w broadcast & point to point network?

Sol:

Broadcast	Point-to-Point
① Channel is shared b/w multiple nodes.	① A dedicated link is shared b/w 2 devices.
② It has single transmission and multiple receiver.	② It has single transmitter & receiver.
③ less secure.	③ More secure.
④ Capacity is shared b/w devices.	④ Capacity of link is dedicated entirely to the chanel.

b) How does the actual data transfer takes place b/w 2 machines?

Sol: The components of communication are:-



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Data transfer is a step by step process, with each step having its own significance. The transmission media that carries the data can be guided or unguided. The signal recived by the receiver have the messages in it which can be decrypted using the same set of rules. This can happen due to common set of protocols used across all the n/w devices used in the world.

c) What is the purpose of NAV in CSMA/CA ?

Sol:

The network allocation vector (NAV) is a virtual carrier sensing mechanism that follows or forms an important part of CSMA with collission avoidance (CA).

This vector can be considered as a counter that counts down to zero. The max NAV duration is the transmission time required by frame, which is the time for which the channel is busy. At the point start of transmission of a frame, the NAV value is set to max. A non-zero value indicates that the channel is busy, so no station contacts for it. When NAV value decrement to zero, it indicates that the channel is free & the other stations can ~~contend~~ be contacted for it.