

Course Code : CST 317

MQNR/MW – 19 / 9610

Fifth Semester B. E. (Computer Science and Engineering) Examination

COMPUTER NETWORKS

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :—

- (1) All questions carry marks as indicated.
- (2) Assume suitable data and illustrate answers with neat sketches wherever necessary.

1. (a) The ISO Reference Model defines seven protocol layers, each of which is responsible for a specific range of functions. By considering this model, explain the main functions performed by a protocol operating at :
 - (i) Data Link layer
 - (ii) Network layer
 - (iii) Transport Layer 5(CO1)
- (b) Mention the conditions necessary for making service reliable. Differentiate between connection oriented and connectionless service with example. 5(CO1)
2. (a) Identify three physical characteristics of fiber optic cables that make them more suitable for high speed digital data transmission than copper cables. Also Explain how data is transmitted along a fiber optic cable. 5(CO2)
- (b) Discuss different propagation modes in unguided singnals. 5(CO2)
3. (a) Explain the concept of Hamming distance. How is it calculated ?
Indicate and explain what would be the minimum Hamming distance for error detection. A code scheme has a Hamming distance $d=4$. What is the error detection and correction capability of this scheme ? If the message bits are 110010110011, find the frame to be transmitted using hamming distance error correction algorithm. 6(CO3)
- (b) Sketch the behavior of a simplex protocol for noisy channel. 4(CO3)

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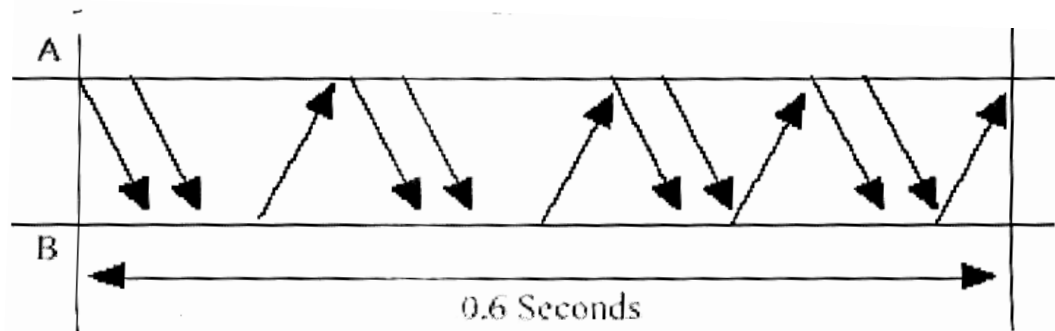
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OR

- (c) How does combination of long transit time, high bandwidth and short frame length is disastrous for efficiency ? How pipelining tries to solve this problem ? 4(CO3)

4. Solve any **Two** :—

- (a) The following frame transition diagram shows an exchange of Ethernet frames between two computers, A and B connected via a 10BT Hub. Each Frame sent by Computer A contains 1500 B of Ethernet payload data, while each frame sent by Computer B contains 40 B of Ethernet payload data. Calculate the average utilization of the media during this exchange.



5(CO3)

- (b) How many persistence strategies do CSMA adopts ? Explain them. Elaborate the working of CSMA CA. 5(CO3)
- (c) A Large population of ALOHA users manages to generate 50 requests/sec, including both originals and retransmissions. Time is slotted in units of 40 msec.
- (a) What is the chance of success on the first attempt ?
- (b) What is the probability of exactly k collisions and then a success.
- (c) What is the expected number of transmission attempts needed ?

Explain how slotted ALOHA works.

5(CO4)

5. Solve any **Two** :—

- (a) Why distance vector algorithm faces count to infinity problem ? How does link state routing algorithm solve problems of distance vector routing algorithm ?
5(CO3)
- (b) A computer on a 7-Mbps network is regulated by a token bucket. The token bucket is filled at the rate of 1 Mbps. It is initially filled to capacity with 8 Mbps. How long can the computer transmit at the full 7 Mbps ? Differentiate between leaky bucket and token bucket.
5(CO3)
- (c) For hierarchical routing with 7200 routers, what region and cluster sizes should be chosen to minimize the size of the routing table for a three-layer hierarchy ?
How does hierarchical routing tries to solve the problem of network saturation ?
5(CO4)

6. (a) What is Two Army Problem ? How does Transport layer allows releasing a connection ?
5(CO3)
- (b) For each of the following applications determine whether you would use TCP or UDP and explain the reasons for your choice.
- (i) File transfer
 - (ii) Watching a real time streamed video
 - (iii) Web browsing
 - (iv) A Voice over IP (VoIP) telephone conversation

Also differentiate between TCP and UDP. 5(CO3)