

B.Sc. (Honours) Examination 2018
Semester-VI
Computer Science
Course : BCSC-61
(Computer Networks)

Time : 3 Hours

Full Marks : 40

Questions are of value as indicated in the margin

Answer **any five** questions

1. a) A bus network system using slotted ALOHA is designed for data rate of 1 Mbps and the slot duration of 2 ms. Illustrate how the maximum length of the bus is linked with these two parameters. Make necessary assumptions.
b) Briefly Illustrate the working principle of a token-ring network.
c) Link speed of a TDMA system is 4 mbps, frame duration is 20 ms and there are 16 slots per frame. Calculate the maximum number of users supported by the system, and available bit-rate per user if each user is allocated one slot every 2 frames. [3+3+2=8]
2. In a CSMA-CD bus network, system, bus length – L mtrs, speed of signal in the medium – c mtrs/sec, data rate – B bits/sec, frame length – f bits and each host uses BE backoff for collision resolution with a transmission window of w seconds.
a) Calculate the minimum latency, which is the time between the packet being ready for transmission, and completion of collision-free transmission in first attempt.
b) If the average number of collisions suffered by a host before successful transmission is n, calculate the average latency. [4+4=8]
3. a) The maximum link-layer packet size of a network is 1500 bytes. If link-layer header size is 48 bytes and IP header and UDP headers are 20 bytes each, calculate the maximum size of the application layer packets.
b) Packets between a client-server pair traverses 4 different physical networks. The maximum link layer packet sizes of the source and destination networks, the first intermediate network and the second intermediate networks are 1500, 800 and 600 bytes respectively. Link layer header sizes for source and destination networks, first intermediate and second intermediate networks are 48 bytes, 32 bytes and 24 bytes respectively. Find out the fragmentation parameters of the IP header for each fragment.
c) Assume any random out of sequence order of reception of the fragments in the destination, and illustrate how they are reassembled in the IP layer. [3+3+2=8]
4. a) An institution is assigned a pure class A pure class-B network Id 144.16.0.0. The administrators keep a provision of creating 8 sub-networks from the network. Find the subnet mask, the network IDs and the maximum number of hosts which could be accommodated in each of these subnetworks.
b) Illustrate the next-hop routing of IP with a suitable example.

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- c) Illustrate the utility and operation of traceroute program using a suitable example.
[3+3+2=8]
5. a) Illustrate the active open and passive open for a TCP session.
b) Illustrate the TCP half-close.
c) Why is the 2MSL timer required in the server side? What is its implication?
[3+3+2=8]
6. a) Illustrate the detection of loss of TCP segments and recovery mechanism of TCP using a suitable example.
b) "TCP assumes that segment errors can happen only due to congestion in the route"- justify.
[4+4=8]
7. Write short notes on
- a) PING program
 - b) IP record-route option
 - c) TTL field of IP
 - d) TCP flow-control [2×4=8]
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