DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER IV [IT]
SUBJECT: (IT407) COMPUTER AND COMMUNICATION NETWORKS

Examination	**: Second Sessional**	**Seat No.**	**: _____**
Date	**: 15/02/2019**	**Day**	**: Friday**
Time	**: 10:30 to 11:45**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed. **[12]**

(a) Define the type of the following destination addresses: **[1]**
a.01:00:0C:CC:CC:CC b. 06:02:03:4B:AB:0C

(b) A and B are the only two stations on an Ethernet. Each has a steady queue of frames to send. Both A and B attempt to transmit a frame, collide, and A wins the first backoff race. At the end of this successful transmission by A, both A and B attempt to transmit and collide, and A wins the second backoff race. At the end of this successful transmission by A, both A and B again attempt to transmit and collide. What is the probability that A wins the backoff race and what is the probability that B wins the backoff race? **[2]**

(c) Station M1 uses 46 byte packets to transmit messages to Station M2 using a sliding window protocol. The RTT between M1 and M2 is 10 microseconds and the bottleneck bandwidth between M1 and M2 is 512 kbps. What is the optimal window size that M1 should use? **[2]**

(d) One organization has asked for a block of ip address, 20.10.63.0/22, is one of the ip addresses of the block it got from ISP. Determine the block id, broadcast id, subnet mask and possible number of hosts. **[2]**

(e) Give comparison of vulnerable time for pure ALOHA and slotted ALOHA. **[2]**

(f) How many collision domains and broadcast domains are there if a 24-port switch is connected with a PC and a router? **[1]**

(g) What is PAP and CHAP? Which one is more secure? **[2]**

Q.2 Attempt ***Any Two*** from the following questions. **[12]**

(a) Why do we have RTS and CTS in wireless LAN? What is NAV? What is use of SIFS? **[6]**

(b) A small organization has 3 LANs in one city with enough distance such that you need a bridge to connect them together. LAN1 is connected using 802.3 (Ethernet), LAN2 is connected via 802.5(Token bus) and LAN3 uses wireless LAN (802.11). Which difficulties encounter when trying to build a bridge between LAN1, LAN2 and LAN3? **[6]**

(c) Draw and explain the control field format in I-frame and S-frame with use of every bit for HDLC protocol. **[6]**

Q.3 (a) Suppose a company has obtained a block of IP space, in the form of 120.32.0.0/24. How many IP addresses have been allocated to this company? Now this company wants to build 4 subnets, subnet 1 needs 60 hosts, subnet 2 needs 30 hosts, subnet 3 needs 14 hosts, subnet 4 needs 10 hosts. The organization wants to keep 100 IPs reserved for future use. What is the subnet mask for each subnet and reserve IP block? What will be the first, last and range of usable ip address for each subnet? **[6]**

(b) A 1Mbps satellite link connects two ground stations. The altitude of the satellite is 36,504 km and speed of the signal is 3×10^8 m/s. What should be the packet size for a channel utilization of 25% for a satellite link using go-back-127 sliding window protocol? Assume that the acknowledgment packets are negligible in size and that there are no errors during communication. **[4]**

(c) If we are using selective repeat sliding window protocol, and window size is 4. Suppose every 5^{th} packet is lost during transmission, assuming no acknowledgement is lost. How many total transmissions should be done to transmit 10 packets? **[2]**

OR

Q.3 (a) What are disadvantages of reservation protocol in multiple access mechanism? **[2]**

(b) Suppose the data rate between A and C is 10 Mbps, the distance between station A and C is 2000 m, and the propagation speed is 2×10^8 *mls.* Station A starts sending a long frame at time t_1=0; station C starts sending a long frame at time t_2=3µS. The size of the frame is long enough to guarantee the detection of collision by both stations. Find: **[6]**
The time when station C hears the collision *(t_3)*
The time when station A hears the collision *(t_4)*
The number of bits station A has sent before detecting the collision.
The number of bits station C has sent before detecting the collision.

(c) Four machines: P, Q, R and S are trying to access the channel using CDMA policy. Suppose the chip sequences for P,Q,R and S are as below: **[4]**
CP : +1 +1 +1 +1 CQ: +1 -1 +1 -1 CR: +1 +1 -1 -1 CS: +1 -1 -1 +1

Suppose, P wants to transmit a bit 1, Q wants to transmit a bit 1, R wants to transmit a bit 0 and S does not want to send anything.
What will be the data on the channel? How will the receiver be able to identify the data bits of every machine?