**Sessional Assignment**

**Submission Date: 03th June, 2020**

1. Briefly describe the services provided by the data link layer
2. Compare and Contrast

* byte-oriented and bit-oriented protocols
* byte-stuffing and bit-stuffing
* flow control and error control
* HDLC and PPP
* Go-Back-N ARQ protocol and Selective-Repeat-ARQ protocol
* circuit-switched network and a packet-switched network
* space-division and time-division switches

1. Explain the protocols for noiseless and noisy channels.
2. Explain Piggybacking in HDLC.
3. Explain blocking in a switched network.
4. Two neighboring nodes (A and B) use a sliding-window protocol with a 3-bit sequence number. As the ARQ mechanism, go-back-N is used with a window size of 4. Assuming A is transmitting and B is receiving, show the window positions for the following succession of events:

* Before A sends any frames
* After A sends frames 0, 1, 2 and receives acknowledgment from B for 0 and 1
* After A sends frames 3, 4, and 5 and B acknowledges 4 and the ACK is received by A

1. List three techniques of digital-to-digital conversion.
2. Distinguish between a signal element and a data element.
3. Distinguish between data rate and signal rate.
4. Draw the graph of the NRZ-L scheme using each of the following data streams, assuming that the last signa11evel has been positive. From the graphs, guess the bandwidth for this scheme using the average number of changes in the signal level. Compare your guess with the corresponding entry in Table 4.1.

a. 00000000

b. 11111111

c. 01010101

d. 00110011

1. What is the number of bits in an IPv4 address? What is the number of bits in an IPv6 address?
2. What are the differences between classful addressing and classless addressing in IPv4?
3. List the classes in classful addressing and define the application of each class (unicast, multicast, broadcast, or reserve).
4. What is a mask in IPv4 addressing? What is a default mask in IPv4 addressing?
5. What is the network address in a block of addresses? How can we find the network address if one of the addresses in a block is given?
6. What is NAT? How can NAT help in address depletion?
7. What is the address space in 16-bit addresses?
8. An address space has a total of 1024 addresses. How many bits are needed to represent an address?
9. Change the following IP addresses from dotted-decimal notation to binary notation.
   1. 129.14.6.8
   2. 208.34.54.12
10. Change the following IP addresses from binary notation to dotted-decimal notation.
    1. 01111111 11110000 01100111 01111101
    2. 10101111 11000000 11111000 00011101
11. In a block of addresses, we know the IP address of one host is 25.34.12.56/16. What are the first address (network address) and the last address (limited broadcast address) in this block?