

## Computer Communication & Networks

BS-SE

Time: 9:00am – 3:00pm

Date: 24/06/2020

### Instructions:

- Allowed time is 6 hours (9:00am to 3:00pm)
- Mark all the answers sheets with page numbers and ID on every sheet number
- Answers copied will both be marked zero
- Late Submission will not be accepted
- Submit in PDF format

1. In a block of addresses, we know the IP address of one host is 101.10.11.  $X / ID_{4+5}$ . What are the first address (network address) and the last address (limited broadcast address) in this block?

*(Note:  $X$  is the sum of your ID e.g. if your ID is 12345,  $X = 15$ ,  $ID_{4+5}$  is the sum of 4<sup>th</sup> and 5<sup>th</sup> digit of your roll number e.g.  $4+5 = 9$ )*

2. Take your Roll No as decimal notation, now convert it to Binary notation. Draw the graph of the NRZ-L scheme using the binary notation of your roll no as data stream, assuming that the last signal level has been positive.

*(Note: If your ID is 12345 convert it to binary and solve)*

3. 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  $ID_{last}$ . 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, 3, 4 and receives acknowledgment from B for 0, 1 and 2
- After A sends frames 5, 6 and B acknowledges 5 and the ACK is received by A

*(Note: If  $ID_{last} > 5$  then  $ID_{last} / 2$  e.g. if your ID is 12344 then  $ID_{last}=4$ , if ID is 24389 then  $ID_{last} = 9$  so  $9/2 = 4$  so window size is 4).*

4. An ISP is granted a block of addresses starting with  $160 . (X) . (ID_{3+4}) . 0/16$

The ISP needs to distribute these addresses to three groups of customers as follows:

- a. The first group has 16 customers; each needs 64 addresses.
- b. The second group has 64 customers; each needs 32 addresses.
- c. The third group has 64 customers; each needs 16 addresses.

Design the sub-blocks and find out how many addresses are still available after these allocations.

*(Note: if your ID is 12345 then the IP address will be 160.15.7.0/16 where X is the sum of ID and  $ID_{3+4}=7$ ).*