Bharatiya Vidya Bhavans

Munshinagar, Andheri(W), Mumbai-400058

COMPUTER ENGINEERING

CE 51: Data Communication Computer Networks,

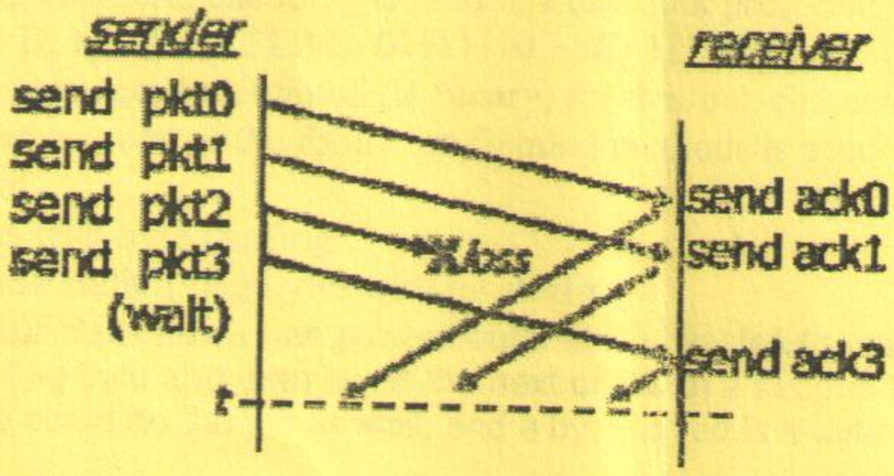
B. Tech III yr. (Sem. V)

Mid Semester Exam

Dt:16/09/2019@10hr. **Total: 20 Marks**

Instruction: *Keep your answers clear and concise, and state all of your assumptions carefully, Note there is no fractional marks for partly correct answer.*

	Answer Following Questions	Mrks	CO BL
Q.1 (a)	The OSI Reference Model has two additional layers. Where these layers in the stack are and what services do they provide?	4	CO1, 3 BL3
Q.1 (b)	A noiseless 4-kHz channel is sampled every 1 msec. What is the maximum data rate? How does the maximum data rate change if the channel is noisy, with a signal-to-noise ratio of 30 dB?	2	
Q.2 (a)	The following character encoding is used in a data link protocol: A: 01000111 B: 11100011 FLAG: 01111110 ESC: 11100000 Show the bit sequence transmitted (in binary) for the four-character frame A B ESC FLAG when each of the following framing methods is used: (a) Byte count. (b) Flag bytes with byte stuffing. (c) Starting and ending flag bytes with bit stuffing. (d) One of your classmates has pointed out that it is wasteful to end each frame with a flag byte and then begin the next one with a second flag byte. One flag byte could do the job as well, and a byte saved is a byte earned. Do you agree?	4	CO1 BL3
Q.2 (b)	Consider following in Figure. Does this figure indicate that Go-Back -N is being used, Selective Repeat is being used, or there is not enough information to tell? Explain your answer briefly with suitable justification.	2	



OR

Q.2 (a)	What is the minimum bandwidth needed to achieve a data rate of *B* bits/sec if the signal is transmitted using NRZ, MLT-3, and Manchester encoding? Explain your answer.	3	CO1 BL3

Q.2 (b)	Why we need line coding? Suppose you are asked to choose line coding scheme mechanisms, so what different types of signaling elements you will consider? Explain.	3	CO1 BL3
Q. 3 (a)	After you finish the router prototype, you need to test it with different packet switching technologies, which may have different MTU. In a test, your router has 3 links with MTU as below:	4	CO4 BL1 BL3

Link	MTU(bytes)
1	60
2	120
3	1000

Now the router receives a 600-byte IPv4 packet from link 3, and it needs to send it to link 2. What will happen? Which header fields need to be updated? If the 600-byte IPv4 packet from link 3 has 20 bytes header, at least how many packets need to be sent over link 2? Write down the value of total length, flag and fragmentation offset fields of each outgoing packet.at least 2 packets.

Q.3 (b)	The Ethernet protocol is called CSMA/CD because it supports carrier sense, collision detection and backoff. For each of these three capabilities, give a brief explanation of what it is and why it offers an improvement over Slotted Aloha.	4	