JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY
Electronics and Communication Engineering
Telecommunication Networks (15B11EC611)
Tutorial Sheet: 4

Q. 1 [CO2] Consider the use of 1000-bit frames on a 1-Mbps satellite channel with a 270 ms delay. What is the maximum link utilization for: a) stop-and-wait flow control, b) continuous flow control with a window size of 7, c) continuous flow control with a window size of 127, and d) continuous flow control with a window size of 255?

Q. 2 [CO2] Repeat Q.1 for Stop-and-Wait (with ARQ) and Selective reject. Assume the probability of a single frame to be in error p=0.01.

Q. 3 [CO2] Derive the link utilization efficiency for selective-reject sliding window protocol, when the sender exhausted its window before it receives an acknowledgement. Consider 'p' is the probability in a bit error.

Q. 4 [CO2] A system uses the Stop-and-Wait ARQ Protocol. If each packet carries 1000 bits of data, how long does it take to send 1 million bits of data if the distance between the sender and receiver is 5000 Km and the propagation speed is $2x10^8$ m/s? Ignore transmission, waiting, and processing delays. We assume no data or control frame is lost or damaged.

Q. 5 [CO2] 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 that the window positions for the following: a) before A sends any frames, b) after A sends frames 0, 1, 2 and B acknowledges 0, 1 and the ACKs are received by A, and c) after A sends frames 3, 4, and 5 and B acknowledges 4 and the ACK is received.