1. Consider an 802.3 LAN with 500 stations connected to five 500 – meters segments. The data rate is 10 Mbps and slot time is 51.2 μsec. If all stations transmit with equal probability, what is the channel utilization using a frame size of 512 bytes? Assume number of contention shots are 1.716.
2. Consider a 10 Mbps ethernet LAN that has stations attached to a 2.5 km long coaxial cable. Given that the transmission speed is $2.3 * 10^8$ m/s, the packet size is 128 bytes out of which 30 bytes are overhead, find the effective transmission rate and maximum rate at which the network can send the data.
3. Suppose nodes A and B are on the same 10 Mbps ethernet segment, and the propagation delay between two nodes is 225 bit times. Suppose A and B send frames at t = 0, the frames collide then at what time they (A or B) finish transmitting a jam signal. Assume a 48 bit jam signal.
4. Suppose two nodes, A and B are attached to opposite ends of the cable with propagation delay of 12.5 ms. Both nodes attempt to transmit at time t = 0. Frames collide and after first collision, A draws k = 0 and B draws k = 1 in the exponential back off protocol. Ignore the jam signal. At what time (in seconds) is A's packet completely delivered at B, if bandwidth of the link is 10 Mbps and packet size is 1000 bits.