EE 450 Homework 3
Spring 2013 Nazarian

Score:___/100

Student ID: _____ Name: _____
Assigned : Friday 2/22/2013
Due: 2/28/2013, Thursday afternoon at 5pm (EE450 HW locker, on the 3rd floor of EE Building.)
Late submissions are accepted for two days with a maximum penalty of 15% per day. For each day, submissions between 5pm-6pm: 2%, 6-7pm: 4%, 7-8pm: 8%. After 8pm: 15%.

1) (50 points) Draw the timing diagram of the communication during a video call between two hosts with 3 hops in between and for all the three switching technologies discussed in class. Also calculate the total latency and compare. Assume the speed of light is $3*10^8$m/s, and the distance between consecutive nodes is 100Km. Suppose that all links are 100Mbps.

Assume the video message is divided into 10 packets if necessary by the technology. Use the following information if applicable to the technology:

i. Each of the processing and queuing for delay per packet and at each node is about $1/4^{th}$ the end-to-end propagation delay between the two hosts.
ii. The video message is overall 100Gbytes.
iii. The total amount of circuit setup and disconnect time is roughly 7 times as long as the end-to-end propagation delay between the two hosts.

2) (10 points) The signal power at a transmitter node is 5KWatts, however it experiences power attenuation while traveling through the medium and decreases to 10Watts when it arrives at the receiver site. . What is the amount of loss (dB) caused by the medium?

3) (30 points) Draw the graph of the Differential Manchester scheme using each of the following data streams assuming that the last signal level has been positive.

a) 00000000
b) 11111111
c) 00110011

4) (10 points) Calculate the signal rate (Rbaud) for the three following cases:

a) 32QAM with bit rate R=560kbps
b) binary FSK with R=32Kbps
c) 16PSK with R=60Kbps.