	CSE320: Data Communication Assignment 2		BRAC UNIVERSITY Inspiring Excellence
Name:	ID:	Sec:	

Chapter 3

1. *Shorty describe attenuation, distortion and noise*

   Define bandwidth and throughput. Also,explain how throughput is different from bandwidth

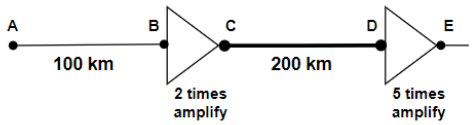
2. *Distinguish between periodic and non-periodic **composite** analog signals with respect to their time and frequency domain.*

3. *Consider a communications channel being used by a cable modem network. The channel has use of the spectrum between 110 MHz and 129 MHz. The average signal power is 22mW and the average noise power is 2mW.*
   1. ***Interpret** the theoretical maximum capacity of the channel in bps.*
   2. *Assume the communication channel is a noiseless channel, **calculate** how many signal levels would be needed using the above bit rate?*

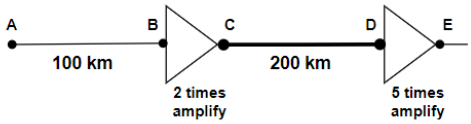
4. *For a voice channel, signals passing through with frequency 210, 290, 330, 400, 580, 630 and 1210MHz. The value of SNR_{dB} is 56. Calculate the theoretical highest data rate for a noisy channel.*

5. *Calculate the total delay (latency) for a frame size of 5.5 million bytes that is being sent on a link with 13 routers each having a queuing time of 2μs and a processing time of 1ms. The length of the link is 3000km. The speed of the light inside the link is $2X10^8$m/s and bandwidth is 7mbps.*

6. *Suppose the signal power is 5 MW at point A. The power loss rate at the wire from A to B is 5 kW/km and from C to D is 0.05 dB/km. **Calculate** the total change of signal power in decibel and comment if the power is being amplified/attenuated.*



7. *Suppose the signal power is 5 MW at point A. The power loss rate at the wire from A to B is 5 kW/km. If the overall attenuation at point E w.r.t point A is -6dB. Calculate the signal power at point D.*



8. Consider a communication channel that requires you to send 108 GB within 6 hours. The link operates on signals with frequency range from 900 KHz to 14 MHz. If the link is perfect, i.e., no noise is introduced in the link,
   - **Determine** the number of voltage levels needed to fulfill the requirement.
   - In practice, there is no noise free channel. Suppose, the strength of the noise power is 20mW which is 60 times weaker than the signal power. **What** will be the channel capacity considering the noise?

Chapter 4

1. Draw Signal using NRI-I, Manchester, Differential Manchester, MLT-3, B8ZS, HDB3

1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 1 1

2. Two devices A and B are sending digital signals using the NRZ-I-line coding scheme. Device C is receiving the signal simultaneously and combining them using bitwise AND operation. Then produces the final digital signal using a line coding scheme that doesn't have the consecutive 0 problem. Illustrate the final signal produced by C. [You can use any valid line coding scheme for C]