Assignment – 1

Semester: 1

Subject: Digital Communication and Networking

Class: FYMCA – A & B

Due Date: 21.09.2023, 5.00pm

1. Consider a noiseless channel with a bandwidth of 6000 Hz transmitting a signal with 64 signal levels. Calculate the maximum bit rate.
2. Consider the same noiseless channel transmitting a signal with 10 bits. Calculate the maximum bit rate.
3. We need to send 265kbps over a noiseless channel with a bandwidth of 20kHz. How many signal levels do we need?
4. Consider an extremely noisy channel in which the value of the signal-to-noise ratio is almost zero. In other words, the noise is so strong that the signal is faint. Calculate the capacity.
5. Calculate the theoretical highest bit rate of a regular telephone line. A telephone line is normally has a bandwidth of 3000. The signal to noise ratio is usually 3162. Calculate the channel capacity.
6. Find the number of levels when the maximum bit rate of the noiseless channel is 4Mbps and bandwidth is 1MHz.
7. Find the SNR when the maximum bit rate is 40Mbps and bandwidth is 2MHz.
8. Find the Manchester and differential Manchester encoding for the given digital data.
   a) 10100111001
   b) 1100101100111
   c) 1111010101001000
   d) 1100010001010010
   e) 11111101011100000