Assignment - 02
Deadline: July 27, 2023

Q1. A non-periodic composite signal contains frequencies from 5 to 40 KHz. The peak amplitude is 10 V for the lowest and the highest signals and is 30 V for the 20-KHz signal. Assuming that the amplitudes change gradually from the minimum to the maximum and then maximum to the minimum , draw the frequency spectrum.

Q2. A signal travels from point X to point Y. At point X, the signal power is 100 W. At point Y, the power is 80 W. What is the attenuation in decibels?

Q3. A line has a signal-to-noise ratio of 2000 and a bandwidth of 12000 KHz. What is the maximum data rate supported by this line?

Q4: What is the total delay (latency) for a frame of size 6 million bits that is being sent on a link with 5 routers each having a queuing time of 5 μs and a processing time of 2 μs. The length of the link is 3000 Km. The speed of light inside the link is 2 × 10^8 m/s. The link has a bandwidth of 10 Mbps. Which component of the total delay is dominant? Which one is negligible?

Q5: A periodic signal has a bandwidth of 20 Hz. The highest frequency is 60 Hz. What is the lowest frequency? Draw the spectrum if the signal contains all frequencies of the same amplitude.

Q6: Discuss Data Rate Limits and its factors.

Q7: Discuss the difference between Attenuation and Distortion.

Q8: A signal with 200 milliwatts power passes through 10 devices, each with an average noise of 2 microwatts. What is the SNR? What is the SNRdB?

Q9: Between a high SNR and a low SNR, which one is more desirable? Explain the reason.

Q10: How many bits are needed if a digital signal has :
I. 67 levels
ii . 128 levels
Iii, 198 levels