Bahria University



*Lahore Campus*

*Department of Computer Sciences*

Data Communication & Networking

Assignment # 02

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**Program:** BSCS

**Semester: 4th**

1. **What is the bandwidth of a signal that can be decomposed into five sine waves with frequencies at 0, 20, 50, 100, and 200 Hz? All peak amplitudes are the same. Draw the bandwidth**
2. **A nonperiodic composite signal contains frequencies from 10 to 30 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, draw the frequency spectrum.**
3. **What is the total delay for a frame of size 5 million bits that is being sent on a link with 10 routers each having a queuing time of 2 μs and a processing time of 1 μs. The length of the link is 2000 Km. The speed of light inside the link is 2 × 108 m/s. The link has a bandwidth of 5 Mbps. Which component of the total delay is dominant? Which one is negligible?**
4. **Draw the graph of the NRZ-L scheme using each of the following data streams, assuming that the last signal level has been positive. Repeat the problem for NRZ-I and Manchester Schemes**

***a. 00000000 b. 11111111 c. 01010101 d. 00110011***

1. **We have sampled a low-pass signal with a bandwidth of 200 KHz using 1024 levels of quantization.**

**a. Calculate the bit rate of the digitized signal.**

**b. Calculate the SNRdB for this signal.**

**c. Calculate the PCM bandwidth of this signal.**