CN101.3 Data Communication and Networks

Tutorial 3 – Chapter 3: Data Transmission

Review Question 1

- A sine wave can be represented by three parameters. What are these three parameters?

Review Question 2

- According to the Fourier Series, any periodic waveform can be represented by an infinite summation of sine waves of different frequencies and amplitudes. Explain this statement with reference to a square waveform.

Review Question 3

- Consider a square waveform of 100kHz frequency. What is the period (T) of this waveform? What is the fundamental frequency of this waveform? What are the dominant harmonics present in the waveform? If this wave travels at the speed of light, what is the wavelength of the wave?

Review Question 4

- Briefly explain the process of attenuation in data transmission. How can this affect digital data transmission? Explain with a suitable sketch.

Review Question 5

- Why is it that analog signals are more susceptible to noise as compared to digital signals? You may use a suitable sketch in your explanation.

Review Question 6

- How does delay distortion occur in data transmission? Briefly explain.

Review Question 7

- Mention four categories of noise which could occur in data transmission and briefly explain each.

Review Question 8

- What factors would limit the bandwidth of a given channel?

Review Question 9

- If the Nyquist Bandwidth of a given channel is B Hz, what is the maximum signalling rate of the channel for binary data? For *M*-level signalling what is the signalling rate?

Review Question 10

- Write Shannon's channel capacity formula and explain the symbols used. In practice, the channel capacity for a given channel is much lower than the calculated value from Shannon's formula. Explain the reasons for this discrepancy.