

EE 302 PS 19 - SOLUTIONS

Chapter 7

Questions: 3, 4, 6, 7

Problems: 1, 2

Critical Thinking: None

Additional Problems: 1- 3

Question 3

Sampling.

Question 4

Quantization.

Question 6

When an analog signal is converted to digital, it is converted to a sequence of binary numbers for processing or for serial or parallel transmission.

Question 7

The output of the D/A converter is a stepped approximation of the original time-varying signal.

Problem 1

The minimum sampling frequency is the Nyquist frequency f_N :

$$f_N = 2f_m = 2(3.5 \text{ MHz}) = 7 \text{ MHz}$$

Problem 2

There are $2^{12} = 4096$ different output voltage levels. The smallest voltage increment is $(5 \text{ V} - 0 \text{ V})/2^{12} = 1.2 \text{ mV}$.

Additional Problem 1

The image quality degrades with each successive copy.

Additional Problem 2

Recording quality of the copy will be inferior to that of the original recording.

Additional Problem 3

... degrade.