Assignment 12

Purpose: To apply knowledge of modulation techniques and their effects on the transmitted signal.

1. True or False: Sampling converts an analog signal to a digital signal.
   - True

2. A continuous-time signal is sampled at a rate of 800 Hz. The analog signal is band-limited to 400 Hz. Which of the following Nyquist rates is正确的?
   - 800 Hz
   - 1600 Hz
   - 2000 Hz
   - 400 Hz
   - None of the above

3. In the above question, what is the Nyquist rate required to avoid aliasing?
   - 1600 Hz
   - 2000 Hz
   - 400 Hz
   - None of the above

4. A voltage source is connected to a 1 kHz sinusoidal signal. The signal is sampled at 3 kHz. How many samples are needed to represent the signal accurately?
   - 1000
   - 2000
   - 3000
   - None of the above

5. Consider a signal that spans from 0 to 10 Hz. It is quantized by a 20-bit ADC. Find the quantization error.
   - ±10 Hz
   - ±20 Hz
   - ±50 Hz
   - ±100 Hz
   - None of the above

6. The Nyquist rate drops by the factor of 1/2 when the input signal frequency doubles. The correct answer is:
   - True
   - False

7. A continuous-time signal is sampled at 2 kHz. The Nyquist rate is 4 kHz. Which of the following statements is correct?
   - True
   - False

8. A continuous-time signal is sampled at 2 kHz. The Nyquist rate is 4 kHz. Which of the following statements is correct?
   - True
   - False

9. A continuous-time signal is sampled at 2 kHz. The Nyquist rate is 4 kHz. Which of the following statements is correct?
   - True
   - False

10. A continuous-time signal is sampled at 2 kHz. The Nyquist rate is 4 kHz. Which of the following statements is correct?
    - True
    - False