

## Signals and Communication II: Review Questions 2

1. Explain what you understand by
  - (a) White noise
  - (b) Thermal noise
  - (c) Shot noise
2. Two  $10\text{k}\Omega$  resistors is operating at  $20^\circ\text{C}$  with a bandwidth of  $1\text{kHz}$  are connected in series. Compute the root mean square noise voltage appearing across the terminals of the resistors.
3. A sinusoidal signal  $\sin(2\pi t)$  is to be sampled and quantized using a uniform quantizer with a quantization level at zero. The samples will be represented using 3 bits.
  - (a) Determine the step size of the quantizer.
  - (b) Draw a graph showing the relationship between the input level and output level.
  - (c) If the sample value is 0.1, give the corresponding output level of the quantizer.
4. Using appropriate equations and graphs, explain the operation of a  $A$ -law non uniform quantizer.
5. Derive an expression for the output signal-to-noise ratio of the Double Sideband Suppressed Carrier modulation system using coherent detection.
6. Consider a binary pulse amplitude modulation system
  - (a) Draw the waveform used to represent the 1 and 0 bits.
  - (b) Sketch the geometric representation of the binary PAM signal.
  - (c) Compute the energy of each of the waveforms.
  - (d) Are the waveforms orthogonal.
7. Sketch a binary Pulse Position signal used to represent the bit sequence 0, 1, 1, 0, 1, 1.