Tutorial 3 - Noise

1. The temperature of a 12 kΩ resistor is 30^{O}C.
   (a) What is the thermal noise power and rms noise voltage over a 10 kHz bandwidth? Sketch the noise spectrum.
   (b) For the same bandwidth, what is the rms noise voltage if the temperature of the resistor is increased by 25^{O}C?

2. (a) If the signal and noise power at the output of an amplifier is 100 mW and 4mW respectively, what is the SNR at the output?
   (b) Another amplifier has signal and noise power of 1000 mW and 10mW respectively at its output. Which output signal is noisier?
   (c) Why low SNR means signal is noisy?

3. The noise factor of a noiseless amplifier which generates no noise would be:
   (a) less than one. (b) one.
   (c) greater than one. (d) zero.

4. Explain why high noise factor means the circuit is noisy?

5. Three amplifiers are to be connected in cascade to amplify a low level signal. They have the following characteristics:

Amplifier	Power Gain	Noise Factor
A	100	11
B	20	9
C	2	6

   Determine the order in which these amplifiers should be connected to give the best noise performance.

6. Identify the main sources of noise in a battery-operated amplifier. The amplifier is enclosed in a metallic chassis. Give reasons for your answers.