VE311 Electronic Circuits

Lab 01

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Laboratory is focused on to understand a few of the things seen in class. Mainly, it is focused on to get the physics behind each device and how can we use them in our favor for future applications.

1. We are going to test the behavior that the resistance has to temperature, humidity, high current and voltage. By using a resistor of 220 Ω, 10 kΩ and the closest to 1 Ω, perform the follow set of tests.
   - By using a wave generator and an oscilloscope, measure the resistor response for a voltage of 1, 5, 10 and 15 V by sweeping the frequency from 10 Hz up to 50 MHz in each case.
   - In each case heat or warm the resistance and see if there is any change in the oscilloscope signal.
   - "Carefully" reduce the temperature of the resistance and see what happen to the signal.
2. The second part considers the use of capacitors. In here, we are going to use a series of capacitors and to understand what happened when they behave at different conditions.
   - Use the capacitors: 0.1 μF, 4.7 pF and 3.3μF. Each one of the capacitors is to be in series with a 10 kΩ resistor. By applying 1 V_{pp} you're going to sweep the frequency ranging from 50 MHz or the highest to 60 Hz.
   - Invert the order of the devices and perform the same test.
3. Finally, with an inductor, we are going to perform a set of experiments. By using a simple array of a 10 kΩ resistor in series with an inductor, we're going to analyze the behavior of the array. By using the wave generator, we are sweeping a range of frequencies from 50 MHz up to 1 Hz with a 1 V_{pp}.

For each one of the experiments you need to obtain a image from the oscilloscope, in which you show the key variations of the experiment. Support your images with appropriate explanation. Each group must submit a report. Be aware of your safety and your team mates.