**EEE 148 LTSpice Tutorial Exercise Answer Sheet**

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| **Collaborated with:** | | |

**GENERAL INSTRUCTIONS:** Provide the required information in the spaces provided. If you run out of room for your answer, feel free to adjust the template as necessary.

Instead of attaching a screenshot of your circuit, kindly upload the schematic file instead.

1. (40 pts) **Transient response**. For each circuit below in Figure 1, use a 20Vpp, 1kHz sine wave as an input signal. Then plot 5 full cycles of the input voltage and the output voltage. Use diode = 1N4148, R = 1kohms, C = 1uF.

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| **Circuit #1**      **Circuit #2**    **Circuit #3**  **Circuit #4** |

* 1. What is the forward voltage of the 1N4148 diode? (5 pts each)
* The forward voltage of the 1N4148 diode is around 0.69 – 0.70 volts.
  1. How long is 5 full cycles with respect to the input? (5 pts each)
* Since the frequency is 1kHz, one full cycle is equivalent to . Which gives us for five full cycles.

1. (10 pts) **Circuit characterization.** Based on the transient responses in the previous item, what do you think each circuit does? - All or nothing. 2.5 pts each circuit
   1. Circuit 1:
   2. Circuit 2:
   3. Circuit 3:
   4. Circuit 4:
2. (50 pts) **AC Analysis/Frequency Sweep.** For each circuit below in Figure 2, use an AC source with 1V amplitude. Use the .step directive of LTSpice to answer the following:
   1. In the CR circuit, find the value of C that will give a cutoff frequency closest to 3.193KHz (Hint: the value is between 10nF and 100nF). Round off to the nearest ten nF. Use R = 1 Kohms. - 20 pts
   2. Based on the Frequency plots, what do you call the CR circuit above? - 5 pts
   3. In the LR circuit, find the value of L that will give a cutoff frequency closest to 530Hz (Hint: the value is between 10mH and 100mH). Round off to the nearest ten mH. Use R = 100 ohms. - 20 pts
   4. Based on the Frequency plots, what do you call the LR circuit above? - 5 pts