**Prelab-6 Worksheet**

**Circuit Analysis – I**

|  |  |
| --- | --- |
| Student Name(s): |  |
| Student ID(s): |  |

## **Task 1: Design Power Supply Network for Maximum Power Transfer to Load Resistor using Thevenin’s Theorem**

1. Derive equations for the Thevenin equivalent of the power supply network shown in Fig. 1. Show the derivation within the space provided below.

|  |  |
| --- | --- |
|  | |
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|  | |
|  | |

1. Use the equations from a. to find the values of and that satisfy the constraints for maximum power transfer and . Show ‘**detailed step-by-step**’ solutions in the space provided below and fill in Table 1 with the design values found as well as the corresponding standard resistor values.

|  |  |
| --- | --- |
|  | |
|  |  |
|  |  |

**Table 1: Design Values for Resistors of Power Supply Network**

|  |  |  |
| --- | --- | --- |
| **Resistor Label** | **Design Resistance Value ()** | **Standard Resistor Value ()** |
|  |  |  |
|  |  |  |

## **Task 2: Maximum Power Transfer Analysis via LTspice Simulation**

**Table 2 - Maximum Power Operating Point from LTspice Simulation**

|  |  |
| --- | --- |
| **Maximum Power, Pmax ()** | **RL at Pmax ()** |
|  |  |

**Screenshot # 1: LTspice Simulation Result – Power vs RL Plot**

(Place your Screenshot # 1 below)

**Prelab-6 Submission Requirements:**

* Convert/save this Prelab-6 Worksheet **as a .pdf file** with a filename as follows:

**If Prelab is done individually:** “Prelab-6\_FirstName\_LastName.pdf”.

**If Prelab is done in a group:** If you have been explicitly instructed by your lab instructor to perform the Prelab exercises in a group, then save this Prelab-6 Worksheet **as a .pdf file** with a filename following the convention below:

Let’s consider that two students are doing the prelab in a group. Then the filename should be: “Prelab-6\_FirstName of Student 1\_FirstName of Student 2.pdf”. For example, if name of the two students are Tom Cruz and Morgan Freeman, respectively, then the Prelab-6 Worksheet file should have the following name: “Prelab-6\_Tom\_Morgan.pdf”. Similar file naming convention should be followed to properly name your LTspice schematic file. Improperly named files may be subject to point deductions.

* **Prelab Submission Checklist:** There should be two files submitted for your Prelab-6 assignment. The Prelab-6 Worksheet (.pdf) and the LTspice schematic file (.asc).
* Check with your lab instructor about specific instructions on how to submit your Prelab files for assessment and grading.

**Prelab Score:** This prelab contributes to 30 points toward Lab 6 (each Task in the Prelab is worth 10 points). In-lab hands-on work will contribute to 70 points (Lab 6 total is 100 points).