Assignment 1C (55 marks) – Lab Week Four (Due: End of your week Five’s lab period).

Lab Week Four Hand-In Sheet / 55 marks

|  |  |
| --- | --- |
| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Student Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Circle Your Lab Period/Time |
| Tue: 10 – 12 Wed: 1 – 3 Wed 3 – 5 Fri 2 – 4 |

PURPOSE OF LAB:

The purpose of this lab exercise is to exercise your understanding of calculating and measuring Voltage, Current, Resistance and Power in Parallel Circuits and Series-Parallel Circuits by analyzing both Multisim-base and paper-based circuits.

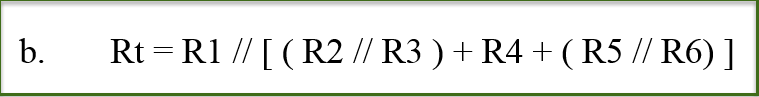
## Instructions

To gain credit for this portion of Week Four’s lab, *independently* complete the questions in the lab exercise and submit this entire document and your calculations for Question Three into your lab portfolio by the lab period indicated at the top of this page. Marks for each question are annotated in the circle beside the question.

**PLEASE STAPLE THE PAGES TOGETHER**.

Question One (12 marks). Resistor networks have total resistances as given below. Nearly sketch a circuit that corresponds to each expression.

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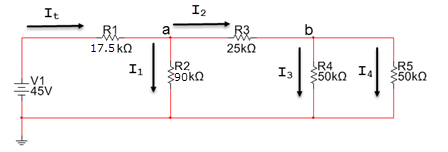
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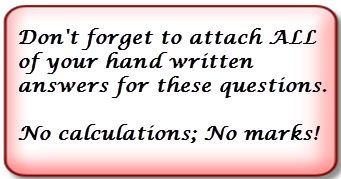
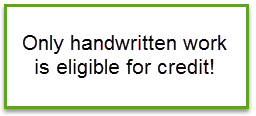
Question Two (8 marks). Build the following circuit in Multisim; calculate the expected values – show all formulas and calculations and then place a rectangular box around your answer. Once you have manually calculated all of the answers, take the appropriate measurements and complete the table below by including a screen shot of the measurements. (From within Multisim, use Tools 🡪 Capture Screen Area).

|  |  |  |
| --- | --- | --- |
|  | C:\Users\haleyd\AppData\Local\Temp\SNAGHTML39602a.PNGExample Multimeter Reading for V1 (See column 3 in the table below) |  |

|  |  |  |
| --- | --- | --- |
| Circuit value | Calculated value (show your work in the space provided) | Measured Value  (cut and paste the multimeter reading to this column) |
| The total circuit Resistance, Rt | |  |
| The total circuit current, It. | |  |
| The current I1 | |  |
| The current I2 | |  |

**For the following questions, you must show all work for full credit by submitting not only this answer sheet, but your neatly *handwritten answers on a separate sheet of paper*** – ***Include all formulas, their calculations and clearly indicate your answers in your rough work***. Use correct engineering prefixes (e.g. k, m, µ, p, M) and correct symbols (e.g. V, A, Ω, W) in all of your answers. Pay particular attention to your CaPiTaLiZaTiOn (example MV ≠ mV, K ≠ k).

Question Three (35 marks). Given the circuit below, complete the following table by first calculating the applicable values; choosing the value that ***most closely matches*** the calculated one and circling its associated letter answer in the **Letter Answer** column. Marks are awarded for correct letter answers placed in the specified column, along with your hand written answers.



|  |  |  |  |
| --- | --- | --- | --- |
| Part | Question | **Letter Answer** | Marks |
|  | The calculated value of Rt is:   1. 17.5 kΩ 2. 77.5 kΩ 3. 49.6 kΩ 4. 37.5 kΩ | |  |  |  |  | | --- | --- | --- | --- | | a | b | c | d | | C:\Users\haleyd\AppData\Local\Temp\SNAGHTML1871471.PNG |
|  | The calculated value of It is:   1. 906.5 µA 2. 9.065 mA 3. 9.1 A 4. 580.6 µA | |  |  |  |  | | --- | --- | --- | --- | | a | b | c | d | | C:\Users\haleyd\AppData\Local\Temp\SNAGHTML1871471.PNG |
|  | The calculated value of I1 is:   1. 0.9 mA 2. 0.324 mA 3. 32.4 µA 4. 0.6 mA | |  |  |  |  | | --- | --- | --- | --- | | a | b | c | d | | C:\Users\haleyd\AppData\Local\Temp\SNAGHTML1871471.PNG |
|  | The calculated value of I2 is:   1. 0.291 µA 2. 582.5 mA 3. 582.5 µA 4. 9 µA | |  |  |  |  | | --- | --- | --- | --- | | a | b | c | d | | C:\Users\haleyd\AppData\Local\Temp\SNAGHTML1871471.PNG |
|  | The calculated value of Vb is:   1. 45 V 2. 29.14 V 3. 8.71 V 4. 14.6 V | |  |  |  |  | | --- | --- | --- | --- | | a | b | c | d | | C:\Users\haleyd\AppData\Local\Temp\SNAGHTML1871471.PNG |
|  | The calculated value of I4 is:   1. 292 µA 2. 0.292 µA 3. 292 mA 4. 9 µA | |  |  |  |  | | --- | --- | --- | --- | | a | b | c | d | | C:\Users\haleyd\AppData\Local\Temp\SNAGHTML1871471.PNG |
|  | The calculated value of Vab is:   1. 0 V 2. 29.14 V 3. 17.14 V 4. 14.6V | |  |  |  |  | | --- | --- | --- | --- | | a | b | c | d | | C:\Users\haleyd\AppData\Local\Temp\SNAGHTML1871471.PNG |