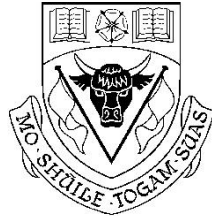


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**Student Name or ID Number**



**UNIVERSITY OF  
CALGARY**

**FACULTY OF ENGINEERING**

**ENGG 325 - Electric Circuits and Systems**

**Midterm Examination**

Spring Session 2004

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**Instructions:**

- Time allowed is 90 minutes.
  - The examination is closed-book.
  - Non-programmable calculators are permitted.
  - The maximum number of marks is 40, as indicated; the midterm examination counts 20% toward the final grade.
  - Please use a pen or heavy pencil to ensure legibility.
  - Please answer questions in the spaces provided; if space is insufficient, please use the back of the pages.
  - Please show your work; marks will be awarded for proper and well-reasoned explanations.
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Name: \_\_\_\_\_, ID: \_\_\_\_\_

1. Specify the resistor values  $R_1$ ,  $R_2$ ,  $R_3$  in the circuit of Fig. Q1 to meet the following design criteria:

- $v_g = 4 \text{ V}$ ;
- $i_1 = 2i_2$ ;
- $i_2 = 9i_3$ .

**[6 marks.]**

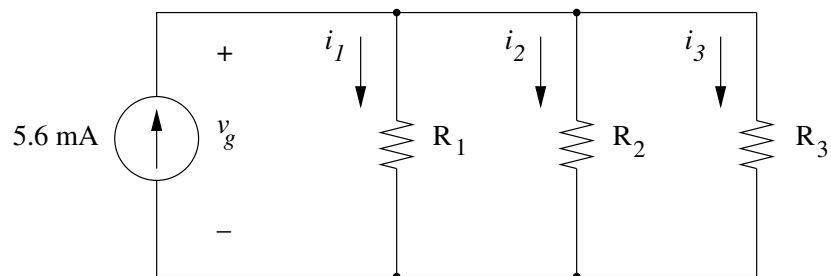


Fig. Q1. Determine  $R_1$ ,  $R_2$ ,  $R_3$

2. Using the principle of superposition, determine the voltage  $v_x$  in the circuit given in Fig. Q2. **[12 marks.]**

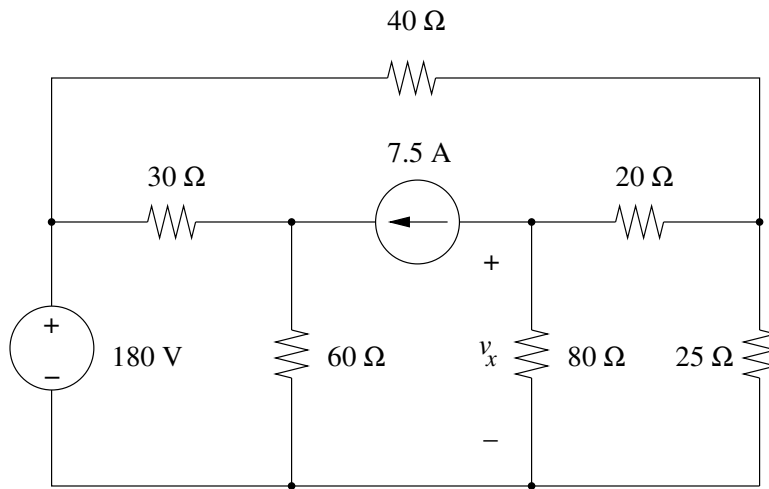


Fig. Q2. Find  $v_x$  by superposition

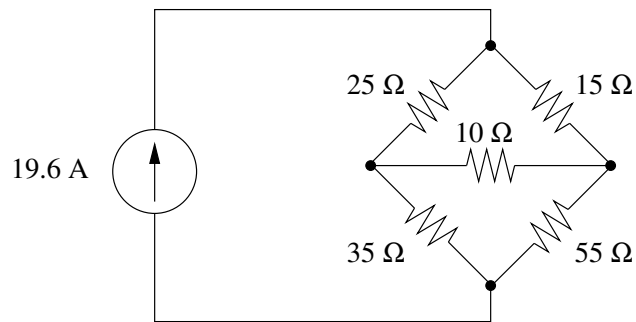
*(Question 2, additional workspace ...)*

3. Consider the circuit shown in Fig. Q3, in which we are to determine the power in the  $10\Omega$  resistor.

(a) Which method of circuit analysis would yield the fewest number of equations to solve? Briefly explain. **[2 marks.]**

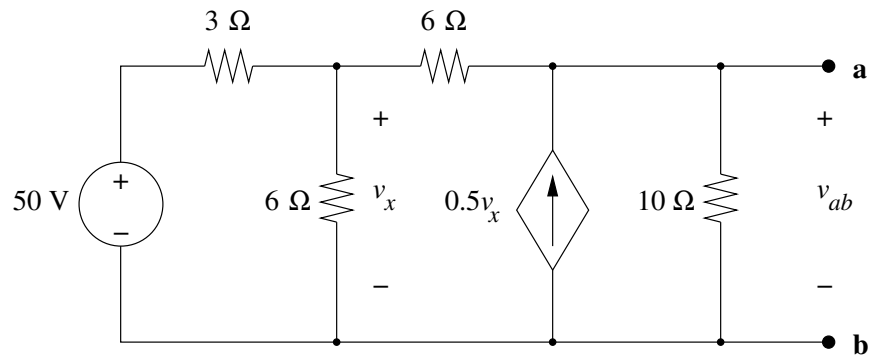
(b) Using the method you chose in part (a), determine the power in the  $10\Omega$  resistor. **[8 marks.]**

**[10 marks total.]**



*Fig. Q3. Find the power in the  $10\Omega$  resistor*

4. Consider the circuit in Fig. Q4. Determine the Thévenin equivalent circuit at the terminals **a** and **b**. **[12 marks.]**



*Fig. Q4. Determine the Thévenin equivalent circuit*

*(Question 4, additional workspace ...)*