Lecture Section: _____

Student Name or **ID Number**

UNIVERSITY OF CALGARY

FACULTY OF ENGINEERING

ENGG 325 - Electric Circuits and Systems

Midterm Examination

Thursday, October 21, 2004
Time: 6:30 - 8:00 PM

Instructions:

- Time allowed is 90 minutes.
- The examination is closed-book.
- Any type of portable calculator is permitted.
- The maximum number of marks is 50, as indicated; the midterm examination counts 25% 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.

Name: _____, *ID:* _____

1. Consider the Wheatstone bridge circuit given in Fig. Q1.

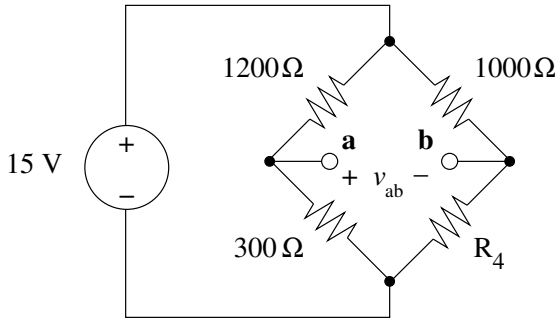

Fig. Q1. A Wheatstone bridge

(a) Suppose that v_{ab} is measured to be -2 V. Determine R_4. **[4 marks.]**

(b) Now connect a 200Ω resistor between nodes **a** and **b**. Determine the power in this resistor. **[6 marks.]**

(Question 1, additional workspace ...)

2. For the circuit shown in Fig. Q2, use the method of your choice to determine v_5 and i_{15}.

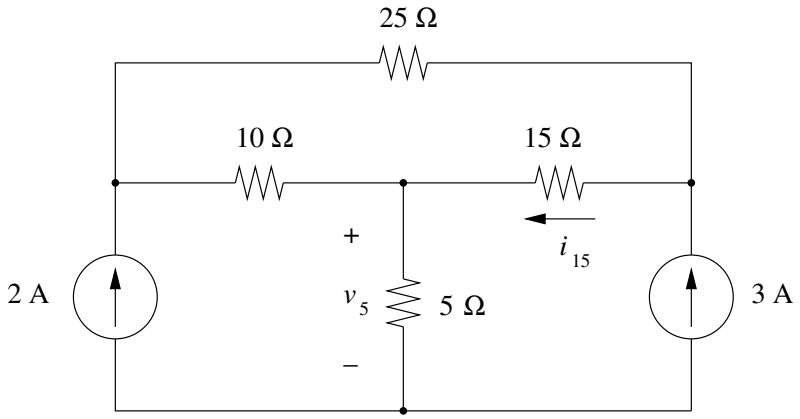

Fig. Q2. Find v_5 and i_{15}

[10 marks.]

3. For the circuit shown in Fig. Q3, use the method of your choice to find the power in the dependent current source, and indicate whether this power is generated or absorbed.

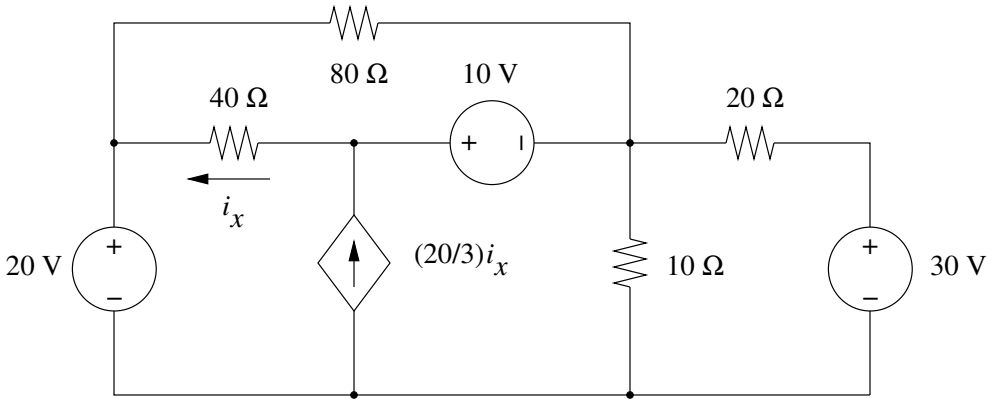

Fig. Q3. Determine power in the dependent current source

[12 marks.]

4. Consider the circuit given in Fig. Q4.

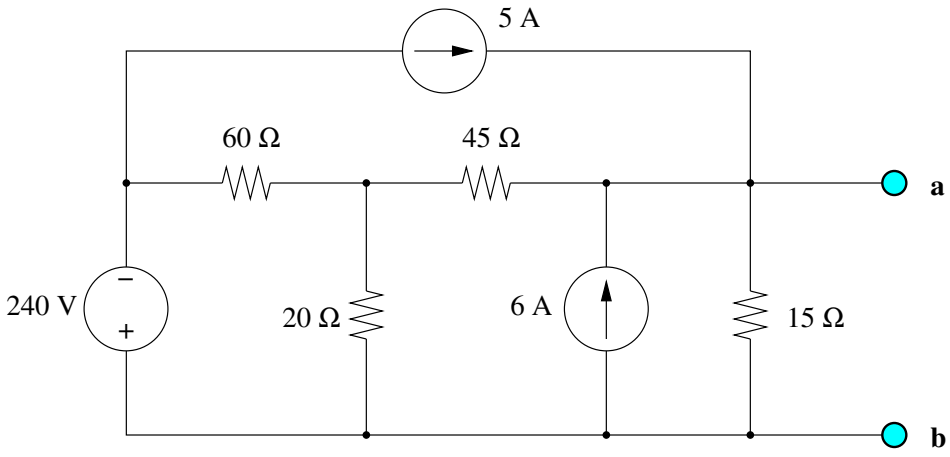

Fig. Q4. Analyze using superposition

(a) Find v_{ab} by superposition. **[12 marks.]**

(b) Place a short circuit between the terminals **a** and **b**, then determine the short-circuit current i_{ab}. **[6 marks.]**

(Question 4, additional workspace ...)