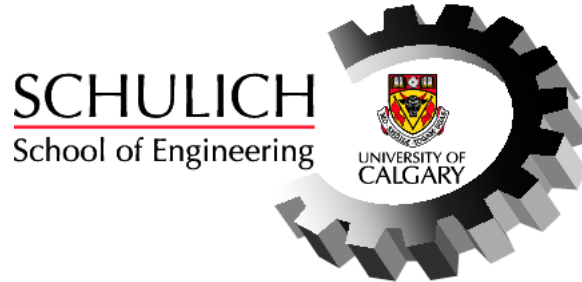


Name or ID: _____

Lecture Section: **L20**



ENGG 325 - Electric Circuits and Systems

Midterm Examination

Spring Session, 2008

Tuesday, June 10, 2008

Time: 1:00 - 2:30 PM

Instructions:

- Time allowed is 90 minutes.
 - The examination is closed-book.
 - Only calculators sanctioned by the Schulich School of Engineering are permitted in the examination.
 - The maximum number of marks is 50, as indicated; please attempt all questions. 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; where appropriate, marks will be awarded for proper and well-reasoned explanations.
-

Name: _____, ID: _____

1. Consider the circuit in Fig. Q1.

- (a) Find the node voltages v_1, v_2, v_3 . **[8 marks.]**
- (b) Find the power in the 2A current source, specifying if power is supplied or absorbed. (If you are unable to determine the node voltages in part (a), you may assume any non-zero values for this part.) **[2 marks.]**

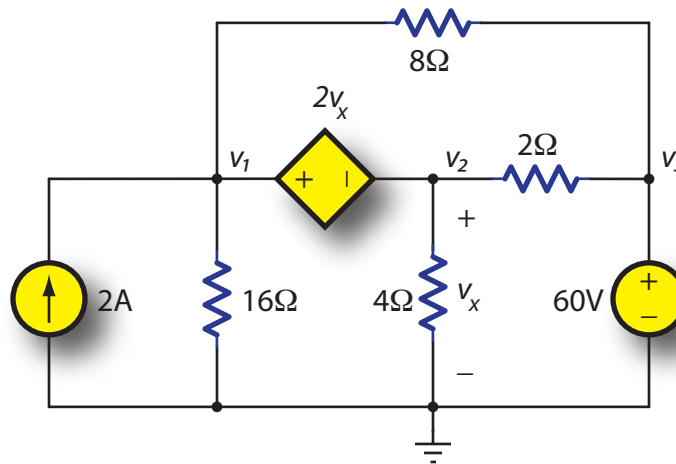


Fig. Q1. Find all node voltages, then power in the 2A source.

[10 marks total.]

(Question 1, additional workspace ...)

2. Consider the circuit given in Fig. Q2.

- (a) Find the mesh currents i_1, i_2, i_3 . **[7 marks.]**
- (b) Using whatever mesh currents you find in part (a), find the node voltages v_1, v_2, v_3, v_4 . (If you are unable to determine the mesh currents in part (a), you may assume any non-zero values for this part.) **[5 marks.]**

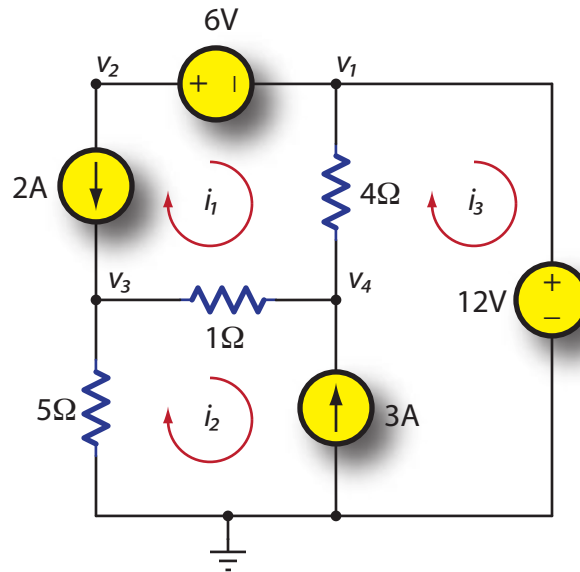


Fig. Q2. Find all of the mesh currents, then node voltages.

[12 marks total.]

(Question 2, additional workspace ...)

3. Consider the circuit shown in Fig. Q3.

(a) Determine the Thévenin equivalent circuit at the terminals **a** and **b**.

[13 marks.]

(b) For whatever you determine in part (a), predict v_{ab} if a current source of 10 A is now placed between terminals **a** and **b**. The direction of this current source is from **a** to **b**. (If you are unable to determine the Thévenin equivalent circuit in part (a), you may assume one with non-zero values). [2 marks.]

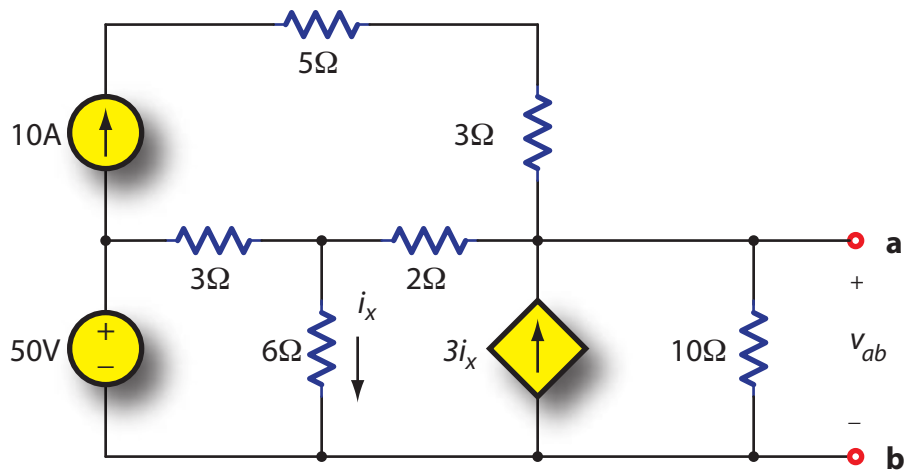


Fig. Q3. Determine the Thévenin equivalent circuit.

[15 marks total.]

(Question 3, additional workspace ...)

4. For the circuit given in Fig. Q4, determine v_x using the principle of superposition.

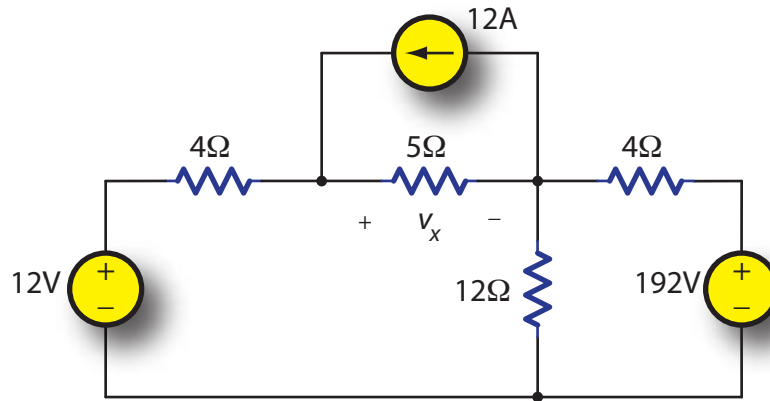


Fig. Q4. Find v_x by superposition.

[13 marks total.]

(Question 4, additional workspace ...)