

Name or ID: _____

Lecture Section: _____

L01, L03 - Anis Haque

L02 - Norm Bartley

L04 - Ed Nowicki

SCHULICH
School of Engineering



ENGG 325 - Electric Circuits and Systems

Midterm Examination

Monday, October 27, 2008

Time: 6:30 - 8:00 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.
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Name: _____, ID: _____

1. Consider the Wheatstone bridge circuit in Fig. Q1. Using a method of your choosing, determine v_{ab} and i_5 for the following values of R_5 .

(a) $R_5 = 400 \Omega$. **[7 marks.]**

(b) $R_5 = 0 \Omega$ (i.e., a short circuit). **[5 marks.]**

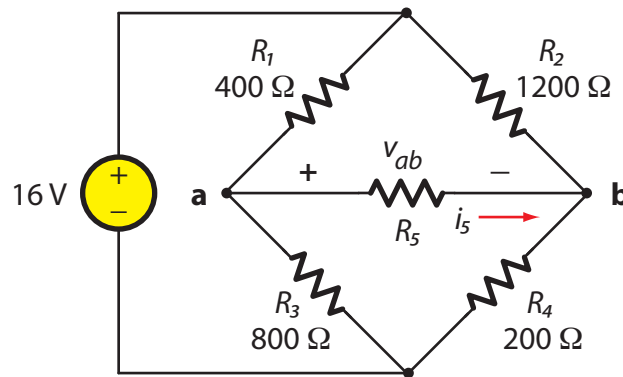


Fig. Q1. Find v_{ab} and i_5 for two different values of R_5 .

[12 marks total.]

(Question 1, additional workspace ...)

2. Consider the circuit given in Fig. Q2.

- (a) Find all of the mesh currents. **[8 marks.]**
- (b) Find the power in each of the 10V and 7A sources, indicating if it is absorbed or supplied. **[4 marks.]**

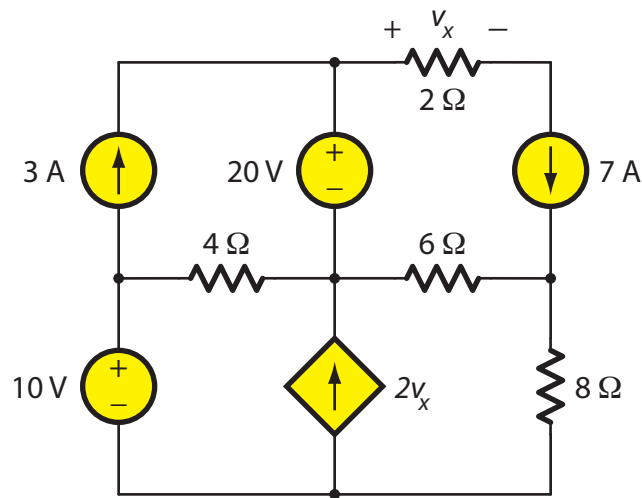


Fig. Q2. Find the mesh currents, power in 10V and 7A sources.

[12 marks total.]

(Question 2, additional workspace ...)

3. Consider the circuit shown in Fig. Q3.

(a) Determine the Thévenin equivalent circuit to the left of the terminals **x** and **y**.

[11 marks.]

(b) Predict v_{xy} if a resistor R_{xy} is now placed across terminals **x** and **y**, where:

- i. $R_{xy} = 2\Omega$;
- ii. $R_{xy} = 6\Omega$;
- iii. $R_{xy} = 8\Omega$;
- iv. $R_{xy} = 20\Omega$.

[0.5 marks each.]

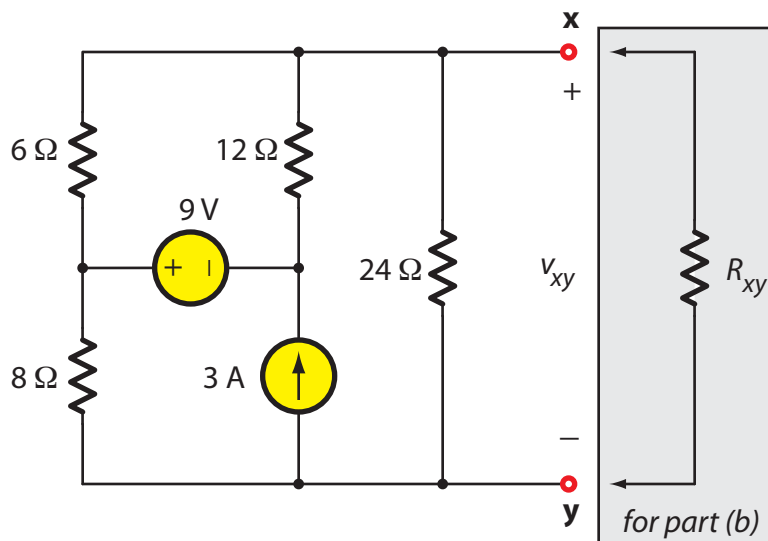


Fig. Q3. Determine the Thévenin equivalent circuit; find v_{xy} for four cases.

[13 marks total.]

(Question 3, additional workspace ...)

4. Consider the circuit given in Fig. Q4.

(a) Find v_y using the principle of superposition. **[8 marks.]**

(b) Find the power for each source, indicating if it is absorbed or supplied. **[5 marks.]**

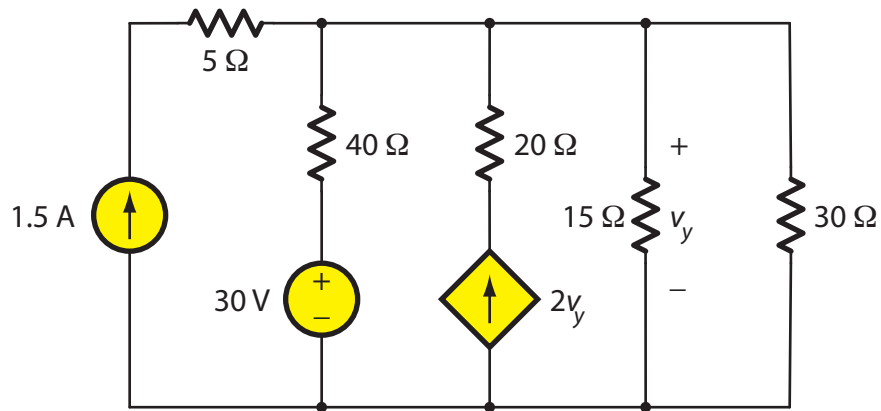


Fig. Q4. Find v_y by superposition; find power in the sources.

[13 marks total.]

(Question 4, additional workspace ...)