

Name: _____

Lecture Section: _____

L01 - Pouyan (Yani) Jazayeri

L02 - Norm Bartley

L03 - Denis Onen

L04 - Anis Haque



ENGG 225 - Fundamentals of Electrical Circuits and Machines
Midterm Examination

Wednesday, March 1, 2017

Time: 7:00 - 8:30 PM

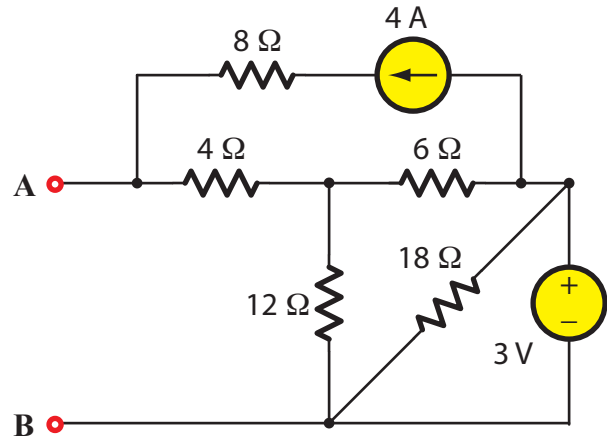
Instructions:

- Time allowed is 90 minutes.
 - The examination is closed-book.
 - Only calculators sanctioned by the Schulich School of Engineering (Casio FX-260, Casio FX-300MS, or TI-30XIIS) are permitted in the examination.
 - The maximum number of marks is 45, 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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UCID: _____

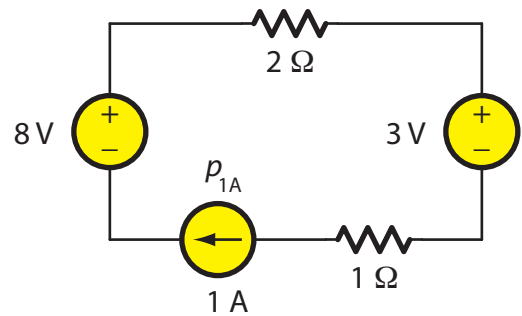
1. [15 marks.] Parts (a)-(e) below each have an identical weighting of three marks. Please answer the questions in the boxes provided.

- (a) [3] In the circuit at right, determine the Thévenin resistance R_t as seen at the terminals **A** and **B**.



Answer: $R_t =$

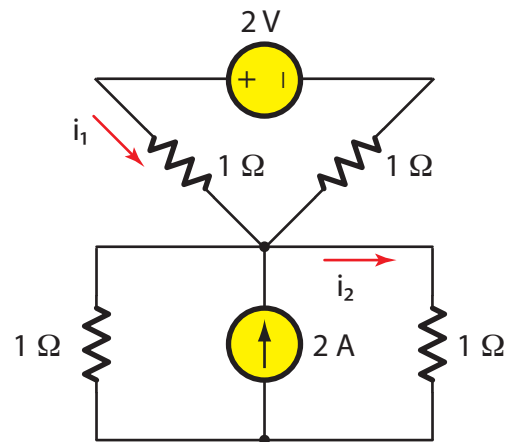
- (b) [3] In the circuit at right, determine the power p_{1A} in the current source, and indicate whether it is delivered or absorbed.



Answer: $p_{1A} =$

Circle One: *delivered* / *absorbed*

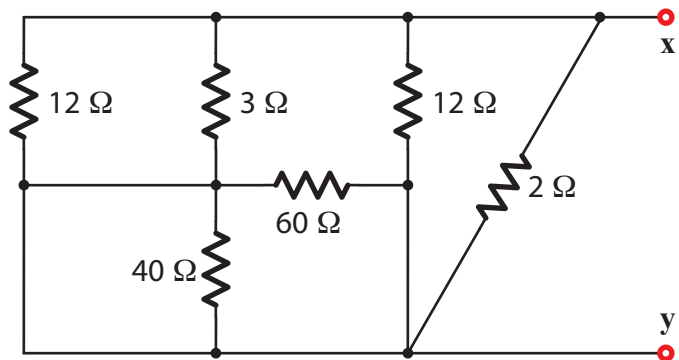
- (c) [3] Solve for the currents i_1 and i_2 in the circuit given at right.



Answer: $i_1 =$

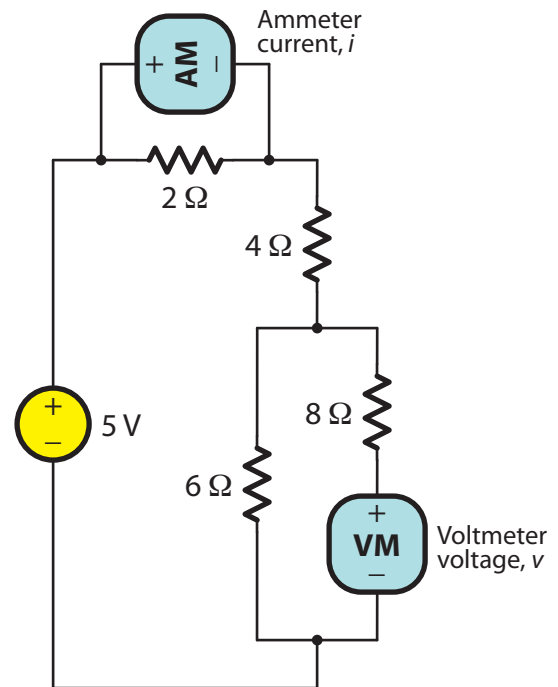
Answer: $i_2 =$

- (d) [3] In the circuit at right, find the total equivalent resistance R_{xy} between the terminals x and y .



Answer: $R_{xy} =$

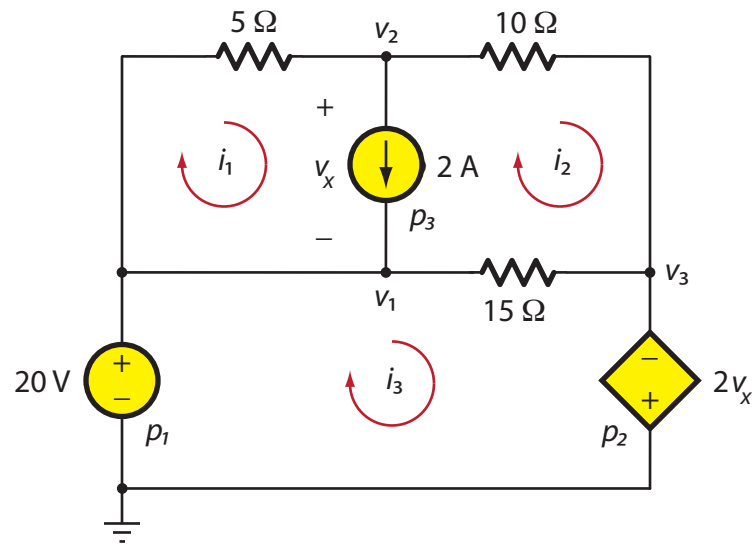
- (e) [3] In the circuit at right, assume that the voltmeter and ammeter are ideal. Give the voltmeter's reading v , and the ammeter's reading i .



Answer: $v =$

Answer: $i =$

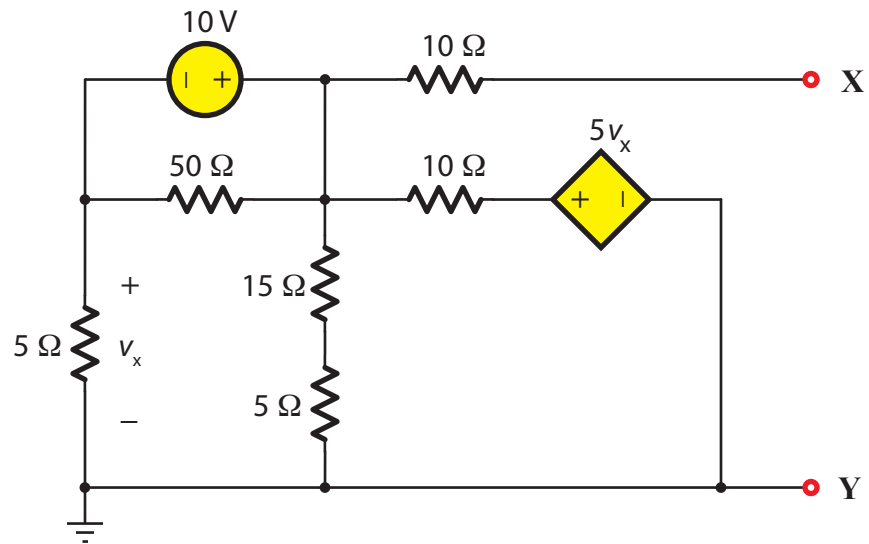
2. [16 marks.] Consider the circuit below.



- [5] Using *only the node-voltage* method, determine v_2 and v_3 .
- [8] Using *only the mesh-current* method, determine i_1 , i_2 , and i_3 .
- [3] Using whatever values you found in parts (a) or (b), calculate the power p_1 , p_2 , and p_3 in the sources; for each source, also state whether power is delivered or absorbed.

(Question 2, additional workspace ...)

3. [14 marks.] Consider the circuit below.



- (a) [12] Determine the Thévenin equivalent circuit at the terminals **X** and **Y**. You may use any circuit-analysis method you wish.
- (b) [2] Predict v_{XY} if a resistance of $6\ \Omega$ is placed between the terminals **X** and **Y**.

(Question 3, additional workspace ...)

(Please do not write in this space.)

#1 (15)	#2 (16)	#3 (14)	Total (45)