

ECE 209 — Exam # 1

Estimated time for completion: <1.25 hour
28 September 2017

Rules of the Exam

Rule 1: The examination period begins at 9:30am on Thursday 28 September 2017 and ends at 10:45pm on Thursday 28 September 2017.

Rule 2: There are four problems.

Rule 3: The exam is closed book and closed notes. You may have an 8.5" x 11" sheet of paper with notes and a calculator.

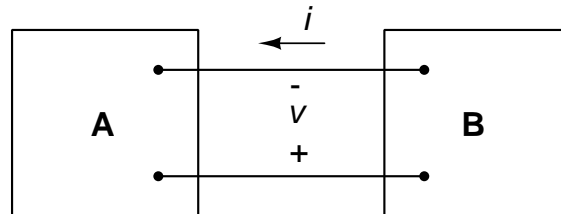
Rule 4: To receive full credit for an answer include the units along with the numerical answer.

Rule 5: Show all work - answers without supporting work will not receive credit.

Name

Problem 1 (20 points)

Two electric circuits, represented by boxes **A** and **B**, are connected as shown in the figure below. The reference direction for the current i and the reference polarity of the voltage v are also shown.

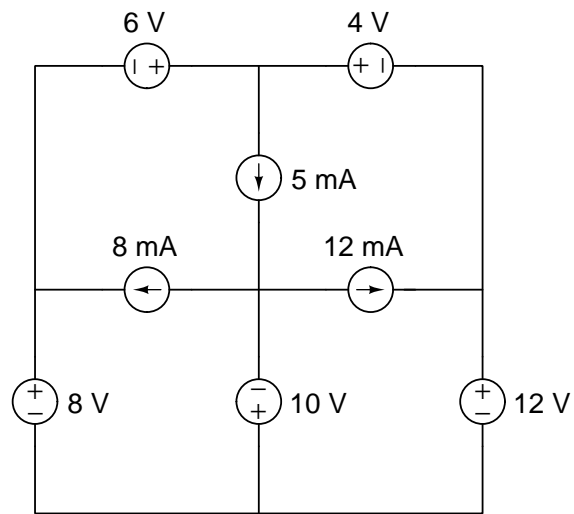


For each set of values of i and v in the table below, calculate the value of the power associated with circuit **A** and circuit **B**.

Condition	i	v	Power for Circuit A	Power for Circuit B
1	-10 A	5 V		
2	5 A	2 V		
3	12 A	-2 V		

Problem 2 (20 points)

Consider the circuit below:



Is the interconnection valid (yes/no)? _____

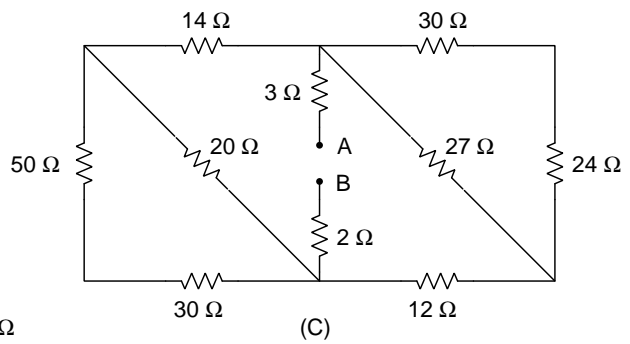
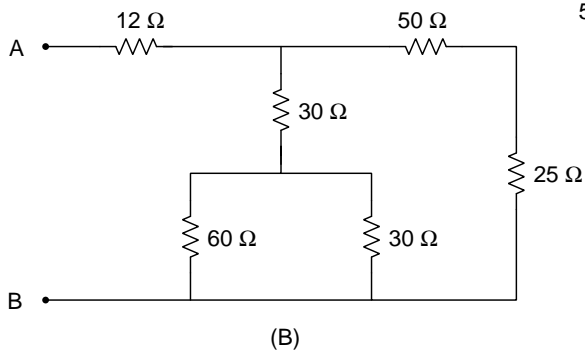
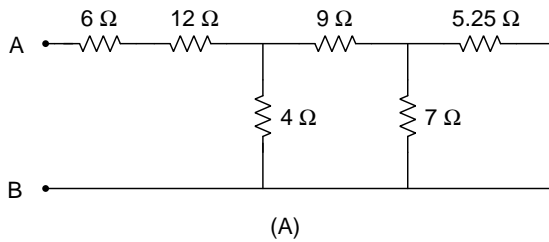
If the interconnection is valid, identify the voltage and current sources that generate power by circling them in the figure above.

If the circuit is not valid, explain why:

Problem 3 (30 points)

Consider the three series and parallel resistor combinations below:

B



For circuits (A), (B), and (C) calculate R_{ab} , the equivalent resistance between terminals A and B:

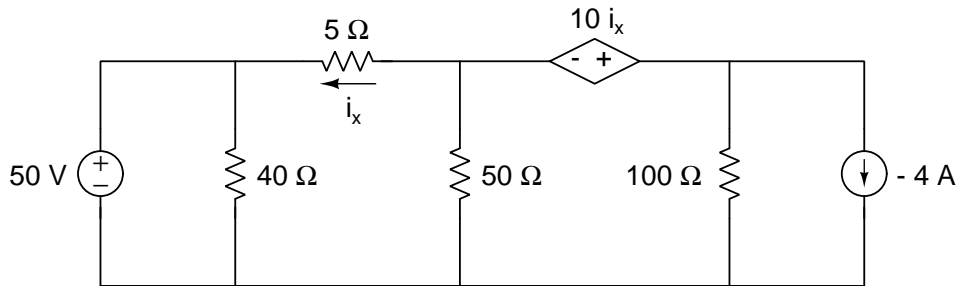
R_{ab} for circuit (A): _____

R_{ab} for circuit (B): _____

R_{ab} for circuit (C): _____

Problem 4 (30 points)

In the circuit shown below, calculate the power associated with each circuit component, the total power generated and the total power dissipated (or absorbed).



Power associated with the 50 V independent source? _____

Power associated with the -4 A independent source? _____

Power associated with the $10i_x$ dependent voltage source? _____

Power associated with the 40Ω resistor? _____

Power associated with the 5Ω resistor? _____

Power associated with the 50Ω resistor? _____

Power associated with the 100Ω resistor? _____

How much power is generated in the circuit? _____

How much power is dissipated or absorbed in the circuit? _____

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