

ECE 209 — Exam # 1

Estimated time for completion: <1.25 hour
1 October 2015

Rules of the Exam

Rule 1: The examination period begins at 11:00am on Thursday 1 October 2015 and ends at 12:15pm on Thursday 1 October 2015.

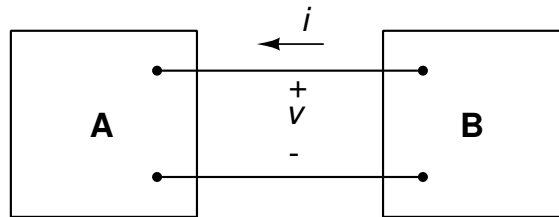
Rule 2: There are four problems.

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.

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.

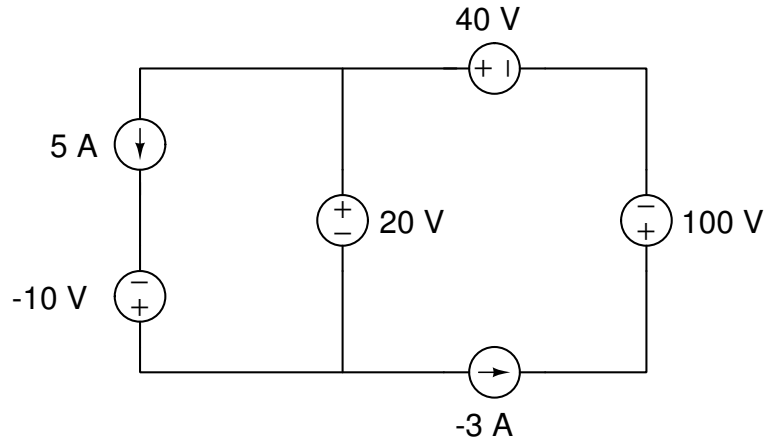


For each set of values of i and v in the table below, calculate the absolute value of the power associated with circuit **B** and indicate if circuit **B** is generating or absorbing power.

Condition	i	v	Power	Generating or Absorbing
1	10 A	125 V		
2	5 A	-240 V		
3	-12 A	480 V		
4	-25 A	-660 V		

Problem 2 (20 points)

Consider the circuit below:



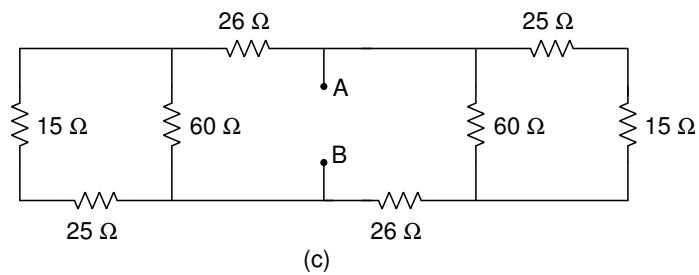
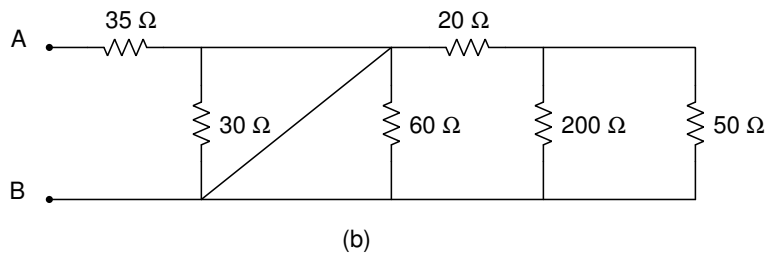
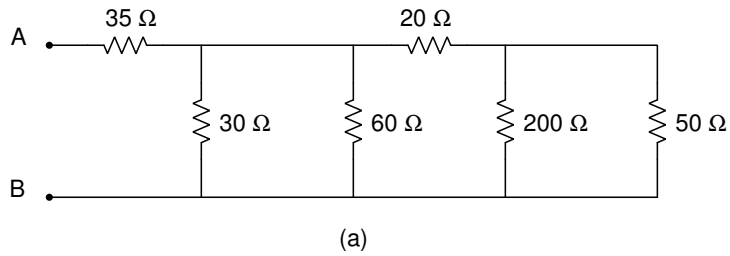
Is the interconnection valid (yes/no)? _____

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)

For the circuits shown below, calculate R_{ab} , the equivalent resistance between terminals A and B :



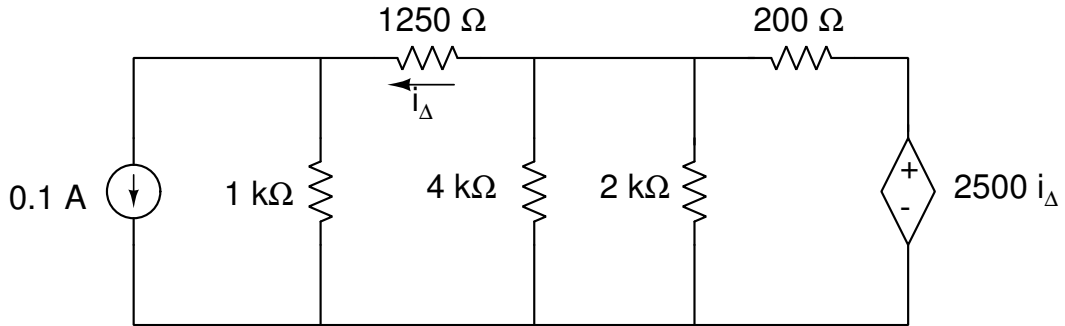
R_{ab} for circuit (a): _____

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 0.1 A independent source? _____

Power associated with the $2500i_{\Delta}$ dependent source? _____

Power associated with the 1250Ω resistor? _____

Power associated with the 200Ω resistor? _____

Power associated with the $1k\Omega$ resistor? _____

Power associated with the $2k\Omega$ resistor? _____

Power associated with the $4k\Omega$ resistor? _____

How much power is generated in the circuit? _____

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