Homework 3

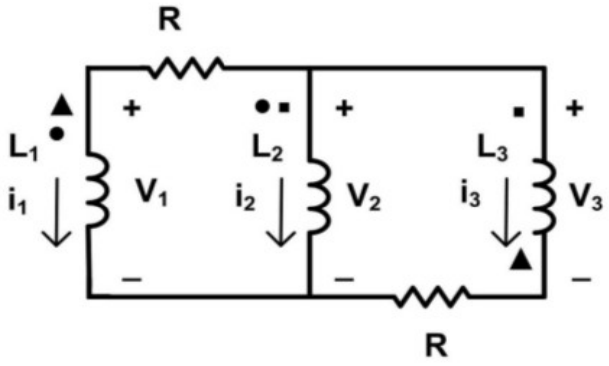
Due 4/26 at 3:00PM on Gradescope

Please write your answers in the boxes provided for Part 2.

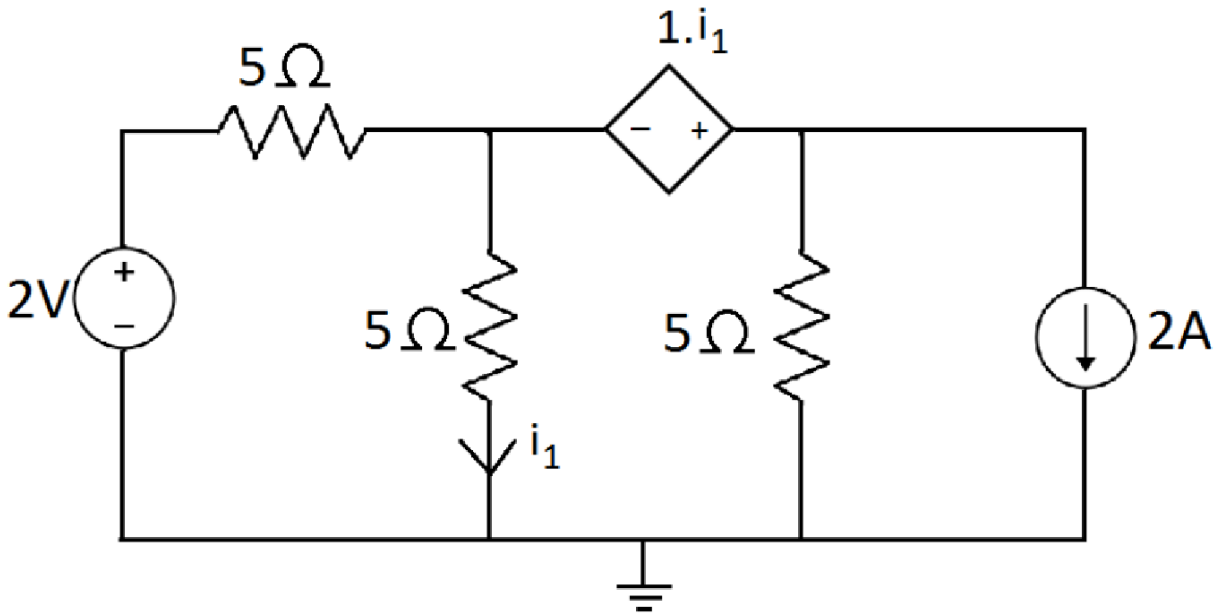
You are not required to submit the solutions to Part 1.

Part 1 (Practice Problems):

1) Use the dot convention to find the voltage on the 3 coils in the following circuit. Assume the mutual inductance between any two inductors is M.



2) Use superposition principle to obtain a value for the current i1 as labeled in the circuit shown below.



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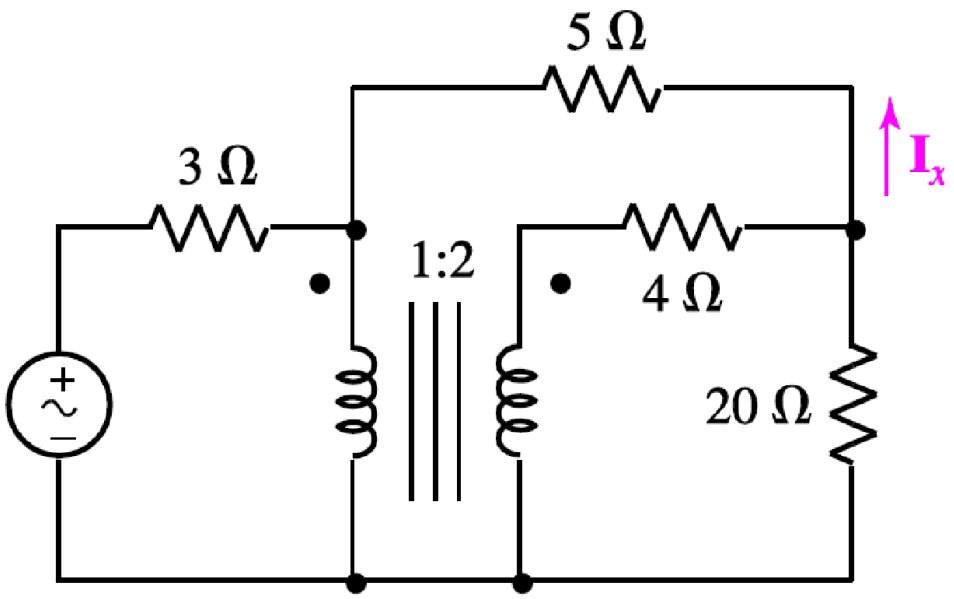
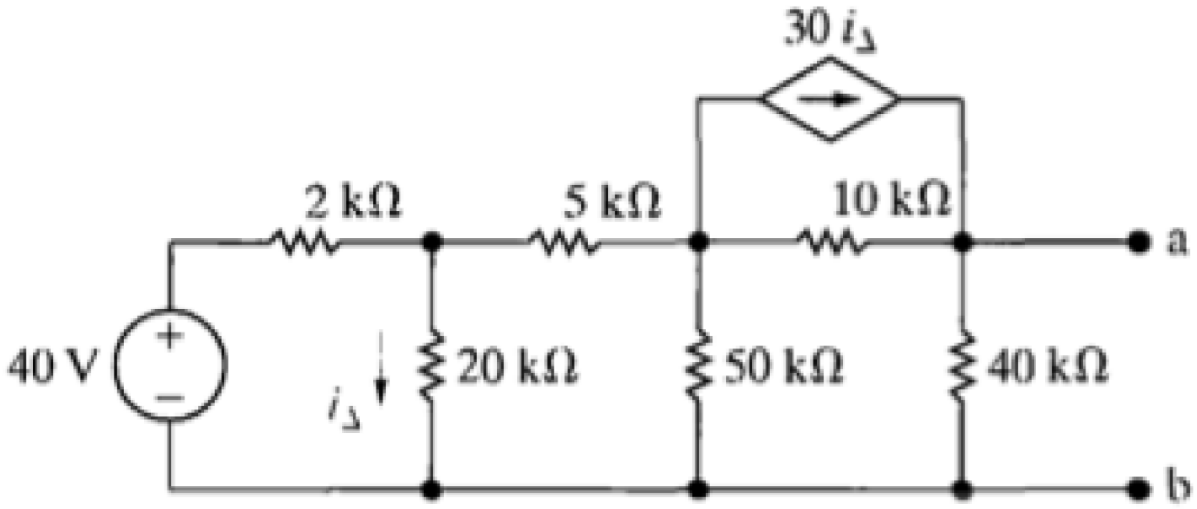
3) Find IX in the circuit below. The transformer is ideal. The voltage source is 100cos(5t).

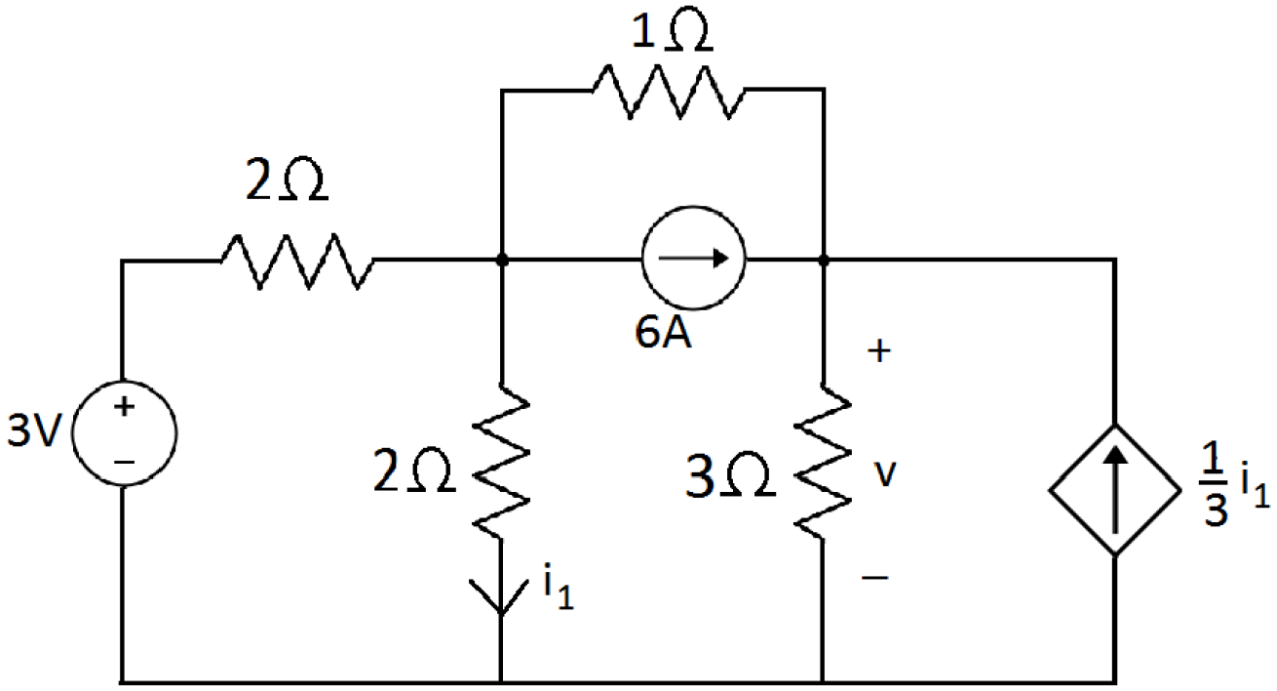


4) Find the Norton equivalent with respect to the terminals a,b for the circuit shown below.



Part 2:

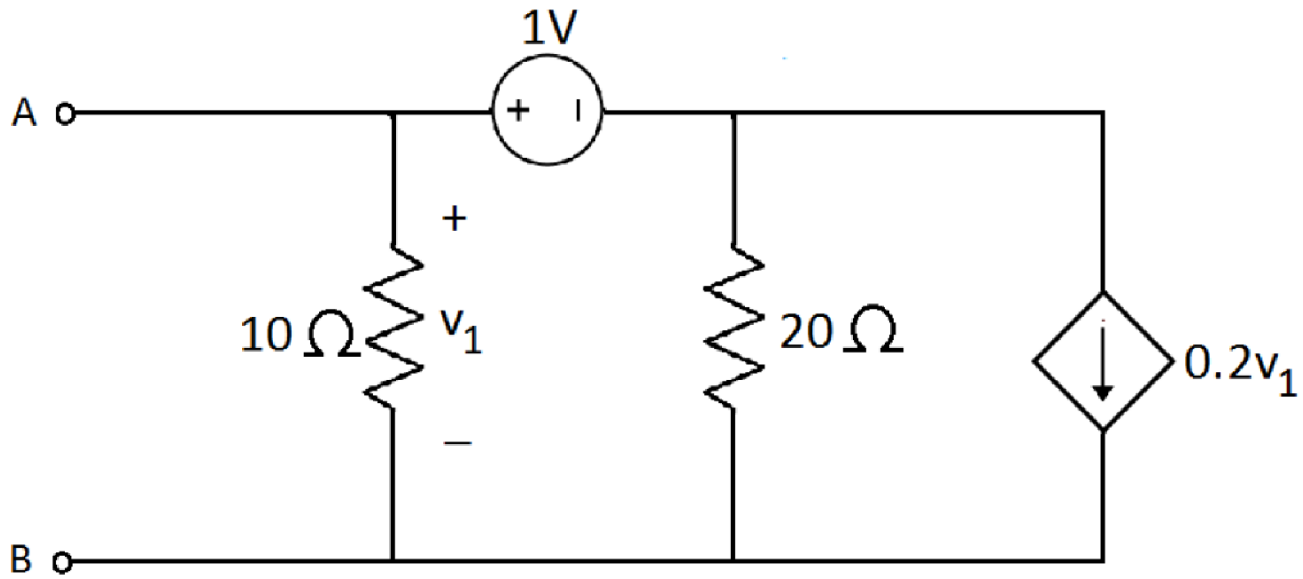
Q1. Use superposition principle in the circuit in the figure below to find the power consumed by that 2Ω resistor which has current i1 flowing through it (as labeled in the circuit).



$P_{2\Omega} =$

Part 2:

Q2. Consider the circuit in the figure below. A resistor R is connected between terminals A and B
of the circuit. Find power dissipated in the resistor R when:
R=10Ω
R=20Ω



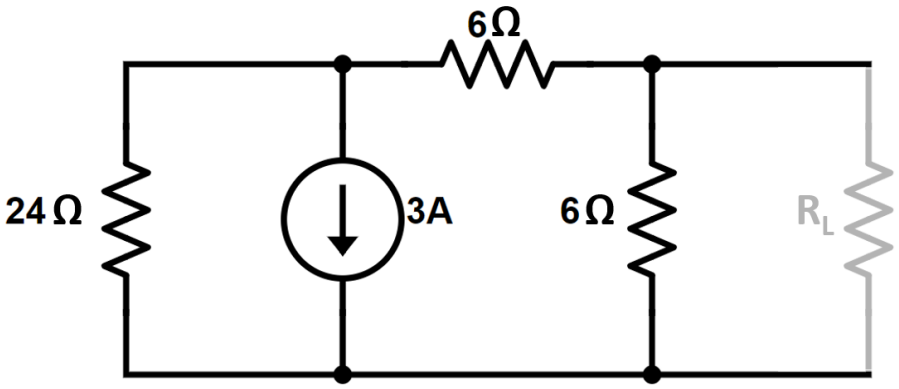
[Hint: Use Norton's theorem to solve this problem.]

$P_R =$

Part 2:

Q3. Problem 2.90 from the book. (Copied below)

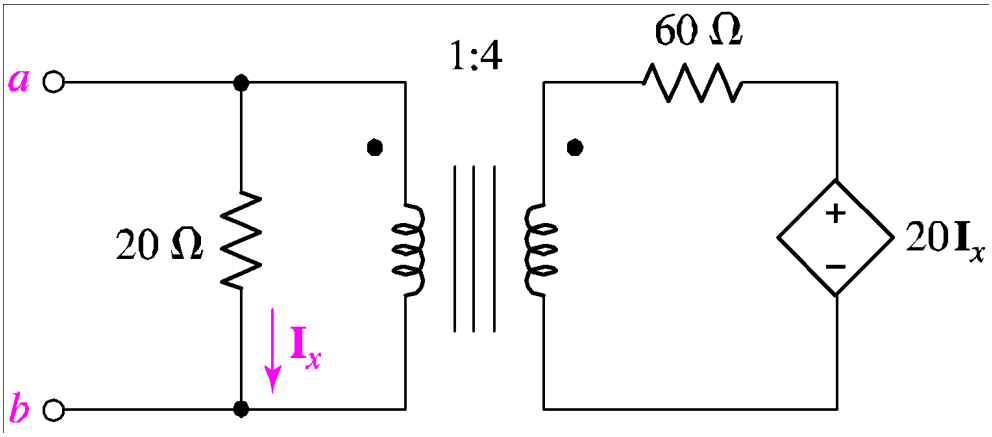
Find the maximum power that can be delivered to a resistive load by the circuit shown in the figure below. For what value of load resistance (R_L) is the power maximum?



$R_{L,Max} =$

Part 2:

Q4. Find the Thévenin equivalent at terminals *a* and *b* for the network shown below.



$R_{Th} =$
$V_{Th} =$