Homework 2

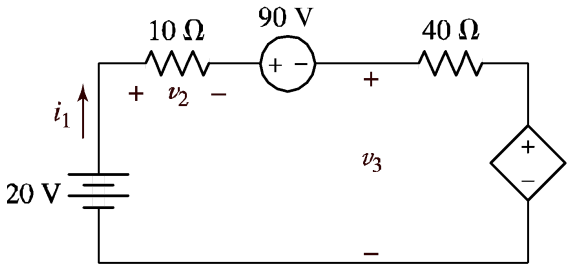
Due 4/19 at 3:00PM on Gradescope

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

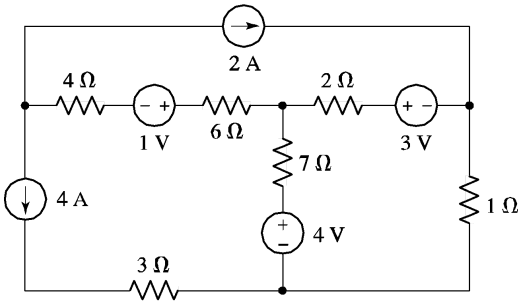
You are not required to submit the solutions to Part 1.

Part 1 (Practice Problems):

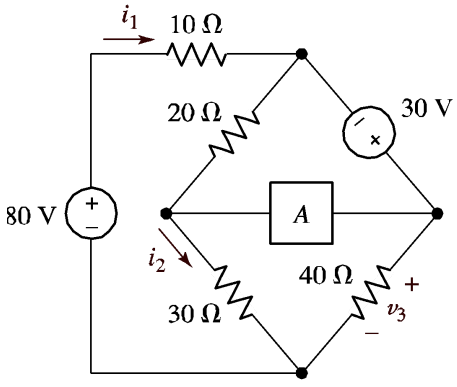
1) Refer to the circuit of figure below and label the dependent source αv_3. Find v_3 and α if (*a*) the 90 V source generates 180 W; (*b*) the 90 V source absorbs 180 W.



2) Determine the power supplied by the 2 A source in the circuit below. (Use source transformations)

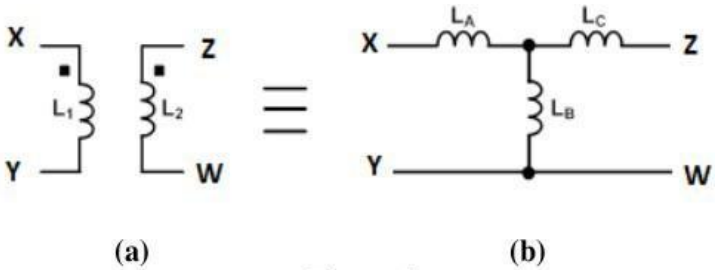


3) Find v_3 in the circuit below if element *A* is (*a*) a short circuit; (*b*) a 9 V independent voltage source, with positive reference on the left.



Part 2:

Q1. Fig 1 below shows 2 equivalent circuits (a) and (b). In circuit (a) the 2 coupled inductors have self-inductances L_1 and L_2 as shown and a mutual inductance M. Find L_A, L_B and L_C in terms of L_1, L_2 and M.



(a) (b)

Figure 1

L_A =
L_B =
L_C =

Part 2:

Q2. Use a series of source transformations to find the current i_o in the circuit given in the Fig 2 below.

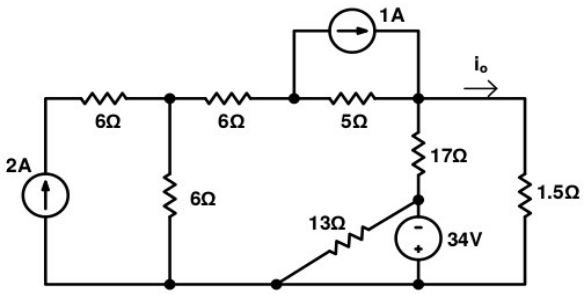
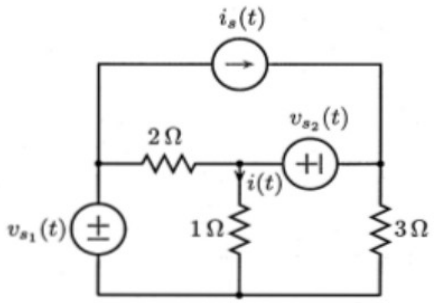


Figure 2

i_o =

Part 2:

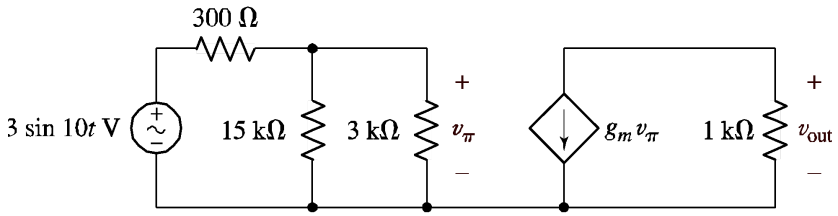
Q3. Refer circuit below. Find i(t) (current flowing through the 1 ohm resistor) in terms of $i_s(t)$, $v_{S1}(t)$, $v_{S2}(t)$.



i(t) =

Part 2:

Q4. The circuit below is a commonly used equivalent circuit used to model the ac behavior of a bipolar junction transistor amplifier circuit. If g_m = 38 m℧ compute v_{out}.



v_{out} =