ENGR 2910-101: Circuit Analysis

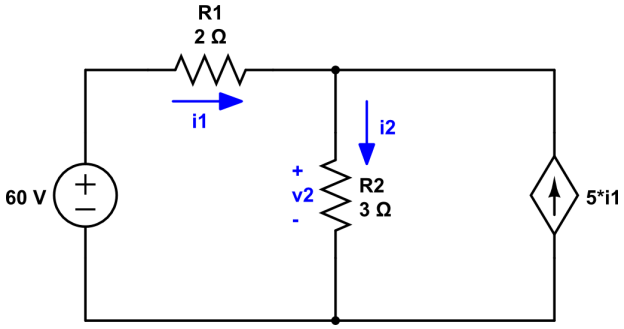
Instructor: Brian Rashap

Midterm 1

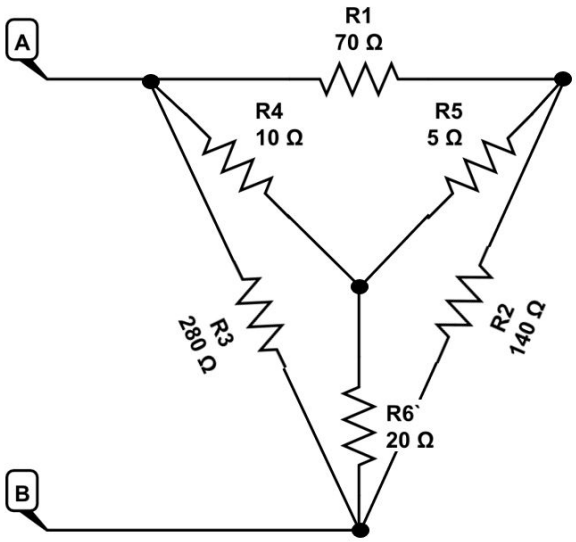
Due: 02/15/23

Please show all your work and circle your answers to each question.

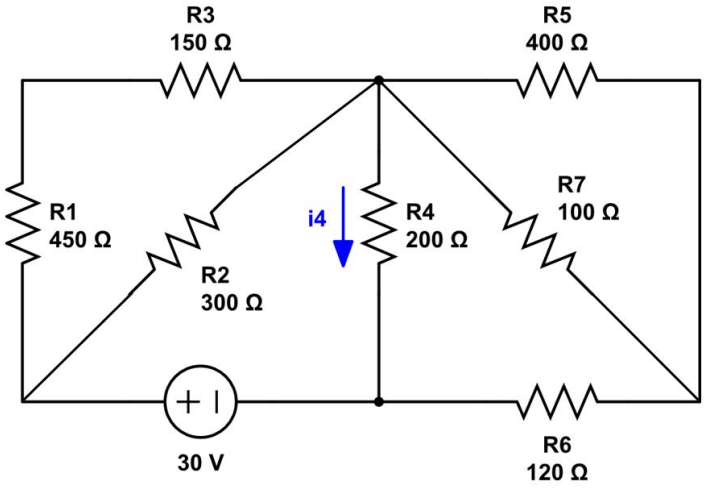
Question 1 [10]
What is the value of v_2?



Question 2 [10]
What is the equivalent resistance between A and B?



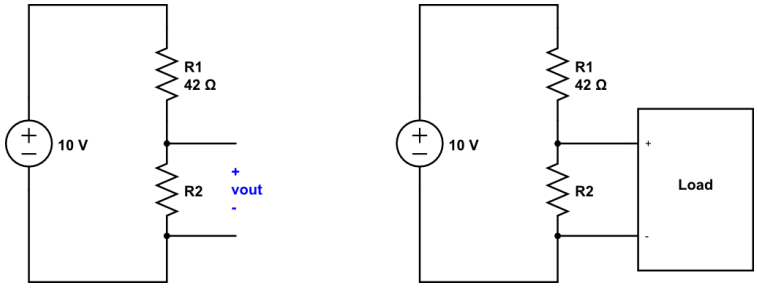
Question 3 [20]
For the below circuit:



(a) What is the equivalent resistance seen by the voltage source (30V)?

(b) What is the current i_4?

Question 4 [20]
Consider the voltage divider below (both with and without a load):



(a) Without a load, what value of R_2 will provide a v_{out} of $3V$?

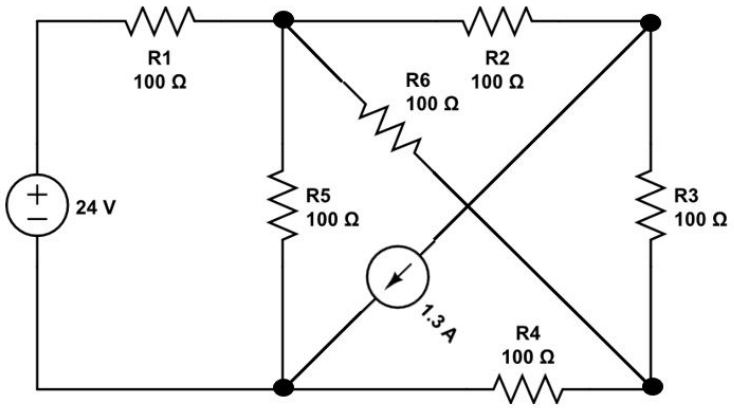
(b) If the load has has a resistance of 9Ω:

(i) For the R_2 above, how does R_1 need to change to maintain proving $3V$ to the load?

(ii) How much Power is being absorbed by the load?

(iii) How much Power is being provided by the $10V$ source?

Question 5 [40]
For the following circuit:



(a) How many essential nodes (n_e)?

(b) How many essential branches (b_e)?

(c) List the essential branches.

(d) Using the Node-Current Method, how many KCL equations are needed?

(e) How many KVL equations are needed?

(f) Write out the Node-Current Matrix (DO NOT SOLVE IT).

Extra Credit
What was the Max Salazar building named after?