VE215 2024FA Assignment 1

Due Date: 23:59, Oct.28th, 2024

In order to get full marks, you shall write all the intermediate steps of calculation or proof unless otherwise indicated. This assignment covers content from chapter 1 to 3.

Exercise 1.1 (20%)

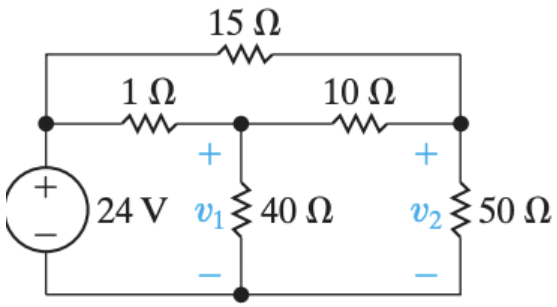
The current entering the positive terminal of a device is i(t) = $2e^{-2t}mA$ and the voltage across the device is v(t) = $15\frac{di}{dt}V$.

(a) Find the total charge in the device at t = 3 s, q(0)=0.

(b) Calculate the power absorbed P(t).

(c) Determine the total energy absorbed in 5s.

Exercise 1.2 (20%) Please find the voltage v_1 and v_2 in the circuit below by using delta-to-wye transformation.



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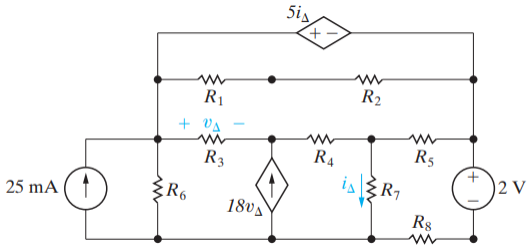
Exercise 1.3 (20%)

In the network graph below

(a) Determine the number of branches, nodes and meshes.

(b) Assuming all the resistor have the resistance of 5 ohm, calculate out $v_{\triangle}$ and $i_{\triangle}$



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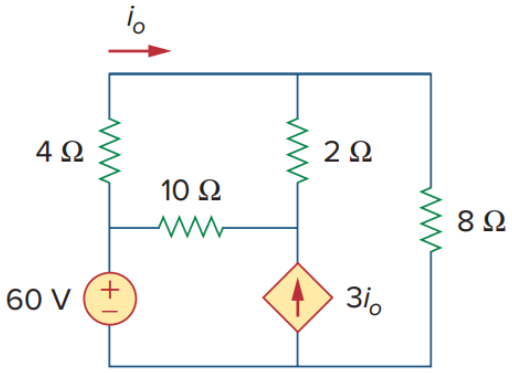
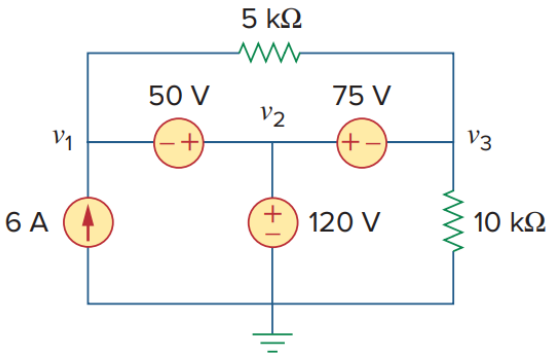
Exercise 1.4 (10+10%)

(a) (10%) Using nodal analysis, find current i_0 in the circuit below.



(b) (10%) Obtain the node voltages v_1, v_2, and v_3 in the circuit below.



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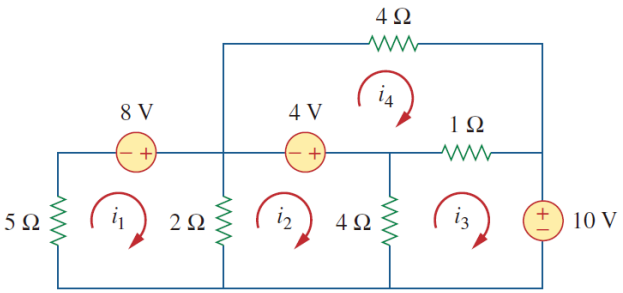
Exercise 1.5 (10+10%)

(a) (10%) Use mesh analysis **by inspection** to find current i_1, i_2, i_3 and i_4 in the circuit below.



(b) (10%) Find current I_1, I_2 and I_3 in the circuit below.