ENGR 065: Circuit Theory

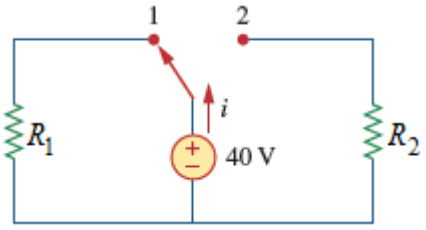
Problem Set #2

Read Chapter 2 from [1] and then solve the following problems:

Problem 1 [20%]:

a) Find the resistance of a light bulb rated 40 W, 120 V.

b) Consider the circuit in the given figure. Assume R_1 = 150 Ω and R_2 = 330 Ω.

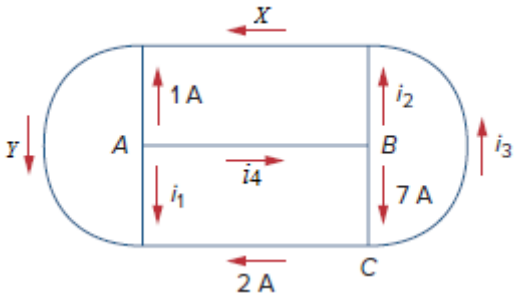


Calculate current *i* when the switch is in position 1.

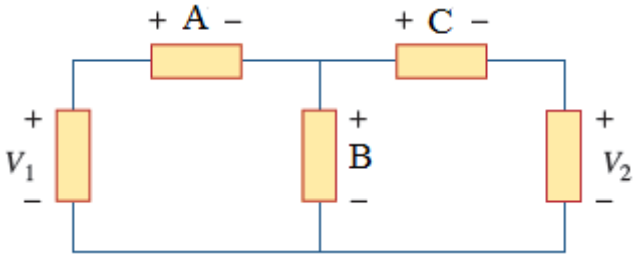
c) Repeat b) but with switch is in position 2.

Problem 2 [20%]:

a) Determine i_1, i_2, i_3, and i_4 in the figure below. Consider X = 4 A and Y = 5 A.



b) In the circuit below, calculate V_1 and V_2. Assume A = 19 V, B = 11 V, and C = 10 V.



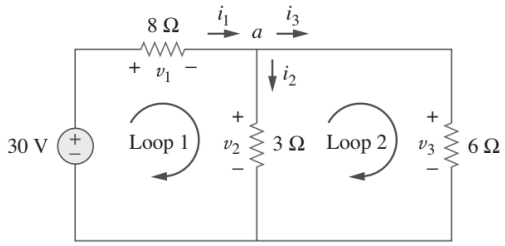
Problem 3 [20%]:

A thermistor is a temperature-sensing element composed of a semiconductor material that exhibits a large change in resistance proportional to a small change in temperature. A particular thermistor has a resistance of 5 kΩ at 25℃. Its resistance is 340 Ω at 100 ℃. Assuming a straight-line relationship between these two values, at what temperature will the thermistor's resistance equal 1 kΩ?

Problem 4 [20%]:

a) find currents and voltages in the following circuit.

b) compute the power absorbed/supplied by each element

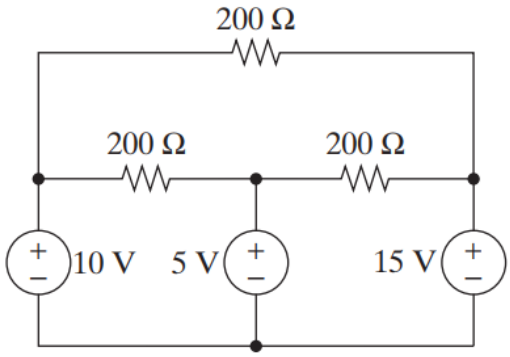


Problem 5 [20%]:

a) Find the voltage across each resistor (hint: use KVL)

b) Find current through each resistor

c) Find current through each voltage source (hint: use KCL)



References

[1] C. Alexander and M. Sadiku "Fundamentals of Electric Circuits", 7th Edition, 2021, McGraw-Hil