Homework #2

MEMS 0031 - Electrical Circuits

Assigned January 18$^{\text{th}}$, 2019
Due January 25$^{\text{th}}$, 2019

Problem #1

- A current source with two resistors in series is shown in Fig.1 below. Suppose that $i_s=2$ [A], $R_1=4$ [Ω] and $R_2=8$ [Ω]. Calculate the voltage across each resistor and the power absorbed by each resistor.
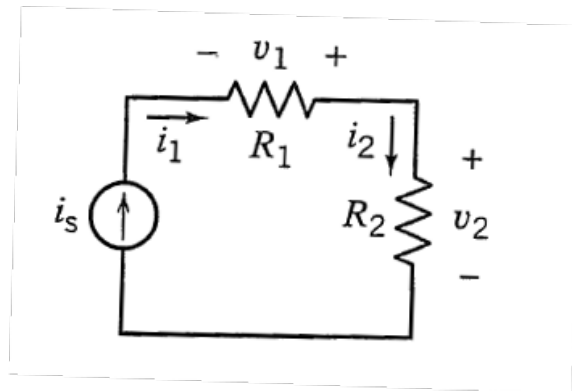

Figure 1: Schematic for Problem #1.

Problem #2

- The ammeter in Fig 2 measures the current from the voltage source, as depicted in (a). The ammeter can be idealized as a short circuit, as depicted in (b). Given that $v_R = v_s = 12$ [V], determine i_m, the current measured by the ammeter, and the power supplied by each element.
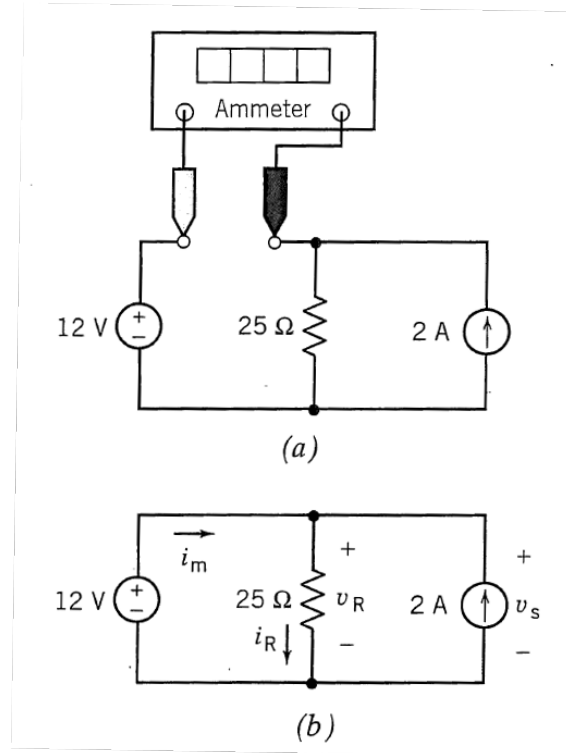

Figure 2: Schematic for Problem #2.

Problem #3

- The ammeter as shown in Fig. 3 measures i_a at 2 [A]. The voltmeter measures v_b at 8 [V]. Determine the gain, r, of the CCVS.
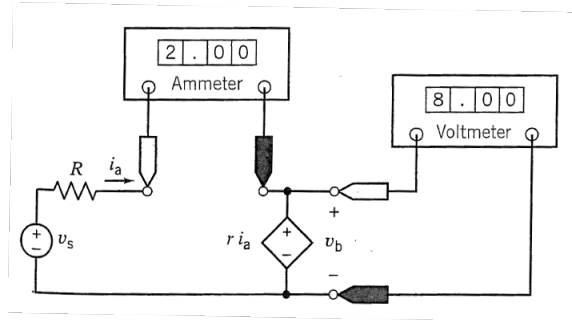

Figure 3: Schematic for Problem #3.

Problem #4

- The circuit shown in Fig. 4 has all the necessary voltage and current values. Determine the values of the resistance R and the gain, A, of the CCVS.
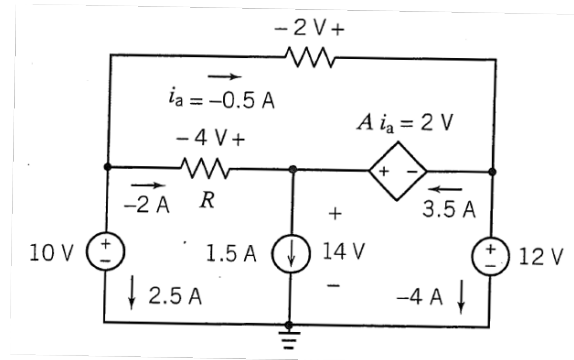

Figure 4: Schematic for Problem #4.

Problem #5

- Determine the voltage, v, when t=1 [s] and when t=4 [s] for the circuit presented in Fig. 5
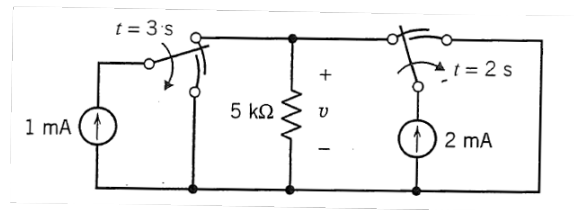

Figure 5: Schematic for Problem #5.

Problem #6

- For the circuit shown in Fig. 6, determine the resistance R that results in a current greater than 40 [mA] to be drawn through said resistor, and that ensures the power absorbed by the resistor is less than 0.5 [W]
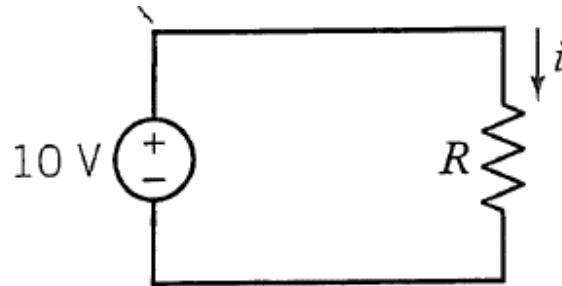

Figure 6: Schematic for Problem #6.