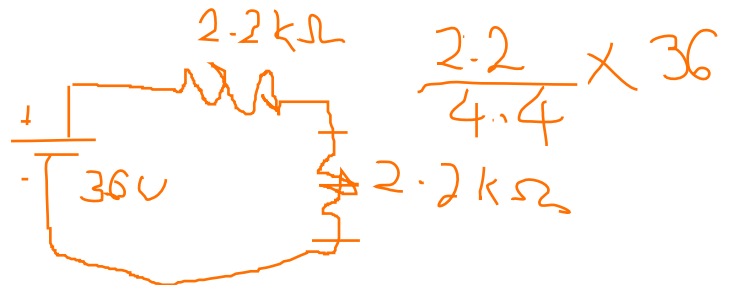
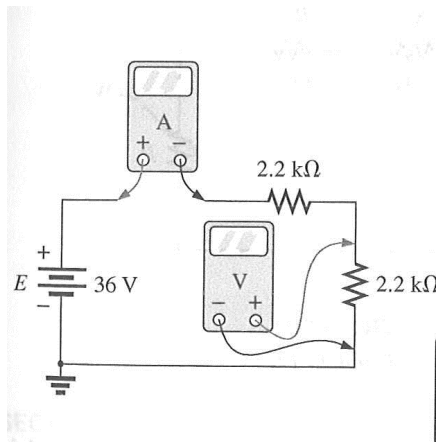


ENGG104 Tutorial 2 Class Questions

Team Name: _____

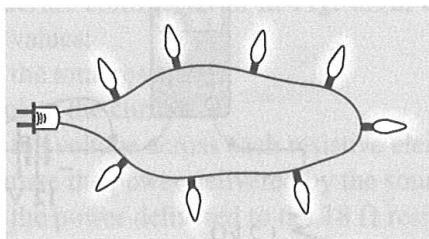
Question 1 [common exam question]



What will the Ammeter and Voltmeter Readings be for the circuit? (Hint: $V=IR$, and Voltage Divider Rule). Also take note of the polarities.

$$a. \quad I_m = \frac{E}{R_T} = \frac{36 \text{ V}}{4.4 \text{ k}\Omega} = \mathbf{8.18 \text{ mA}}, \quad V_m = \frac{1}{2}E = \frac{1}{2}(36 \text{ V}) = \mathbf{18 \text{ V}}$$

Question 2



Eight holiday lights are connected in series as shown in Fig. 5.100.

- a. If the set is connected to a 120 V source, what is the current through the bulbs if each bulb has an internal resistance of $28\frac{1}{8} \Omega$?

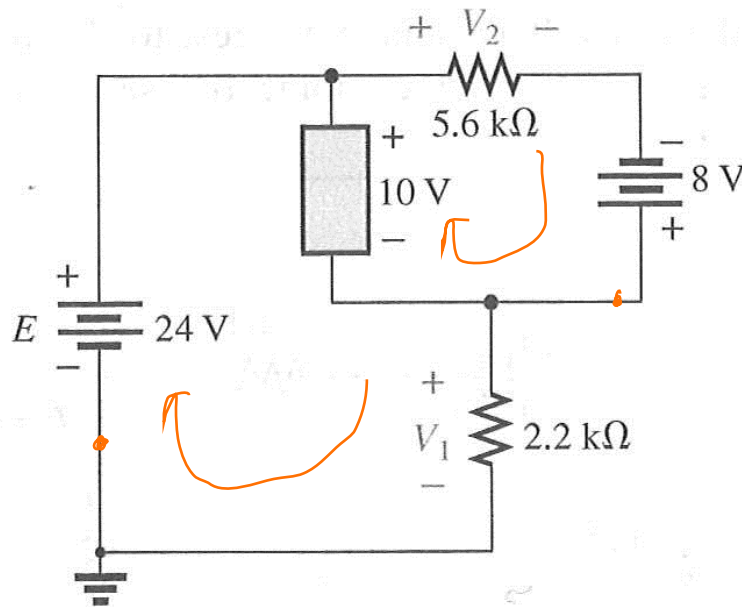
[Hint: what is the total resistance?, then $V=IR$]

$$a. \quad R_T = NR_1 = 8\left(28\frac{1}{8} \Omega\right) = 225 \Omega$$

$$I = \frac{E}{R_T} = \frac{120 \text{ V}}{225 \Omega} = \mathbf{0.53 \text{ A}}$$

Question 3 [Past exam question]

Using KVL determine the unknown voltages [remember KVL states that the sum of voltages around a loop are equal to zero, hence write an equation for each loop]

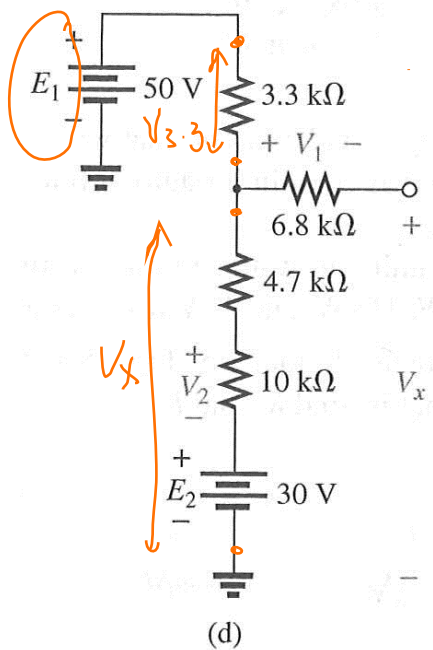


$$-24 + 10 + V_1 = 0$$

$$\begin{aligned} +24 \text{ V} - 10 \text{ V} - V_1 &= 0 \\ V_1 &= 14 \text{ V} \\ +10 \text{ V} - V_2 + 8 \text{ V} &= 0 \\ V_2 &= 18 \text{ V} \end{aligned}$$

Question 4 [Challenging problem]

Find all the unknown voltages [Recognise which branch has no current, KVL]



$$V_1 = 0 \text{ V}$$

$$\begin{aligned} V_2 &= \frac{10 \text{ k}\Omega(50 \text{ V} - 30 \text{ V})}{10 \text{ k}\Omega + 3.3 \text{ k}\Omega + 4.7 \text{ k}\Omega} \\ &= \frac{10 \text{ k}\Omega(20 \text{ V})}{18 \text{ k}\Omega} = 11.11 \text{ V} \end{aligned}$$

$$V_x = E_1 - V_{3.3\text{k}\Omega}$$

$$\begin{aligned} V_{3.3\text{k}\Omega} &= \frac{3.3 \text{ k}\Omega(20 \text{ V})}{18 \text{ k}\Omega} \\ &= 3.67 \text{ V} \end{aligned}$$

$$V_x = 50 \text{ V} - 3.67 \text{ V} = 46.33 \text{ V}$$