

The objective of this homework is to test your understanding of the content of Module 5. Due date of the homework is: **Wednesday, October 7th, 2020**. You have to upload a scanned version of your solutions on Blackboard. If you don't have a scanner around you, you can use Cam Scanner—a mobile app that scans images in a neat way, as if they're scanned through a copier.

For questions related to the homework, please email the two teaching assistants: (a) Wasim (email: wasim.dipon@my.utsa.edu) and (b) Yuvaraj (email: yuvaraj.munian@my.utsa.edu).

You can send your question to both of them on the same email. Feel free to CC me as well, but that is not necessary.

1. Units Exercise: (5 Marks)

- (i) Express 5,800 ohms (Ω) in kilo-ohms (k Ω).
- (ii) Express 0.000055 amps (A) in terms of micro-amps (μ A).
- (iii) Express 122,700,000 hertz (Hz) in megahertz (MHz).
- (iv) Express 0.73 mA in units of amps (A).
- (v) Express 9.8 kilo-ohms (k Ω) in ohms (Ω).

2. A circuit has a total resistance of 10 K Ω and a total voltage of 40V. What is the total current in milliamps? Using the result, what is the power in the circuit in milliWatts? (20 Marks)

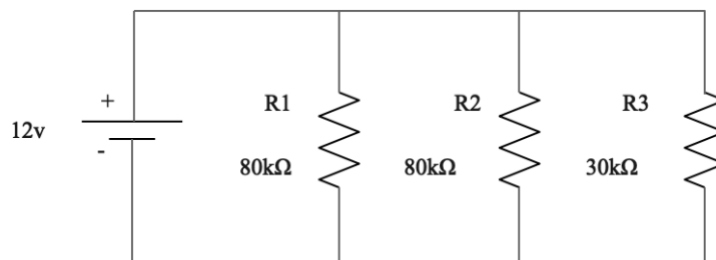
[Hint1: For analyzing electrical circuits, engineers make use of Ohm's Law is $V = I \cdot R$. (Voltage in Volts(V), Current in amps(A), Resistance in ohms (Ω)). Hint2: Power in the circuit is $P = I \cdot V$. (Voltage in Volts(V), Current in amps(A), Power in Watts (W))]

3. Determine the equivalent resistance R_{eq} of the following three resistors in series: $R_1 = 20 \Omega$, $R_2 = 100 \Omega$, $R_3 = 90 \Omega$. (10 Marks)

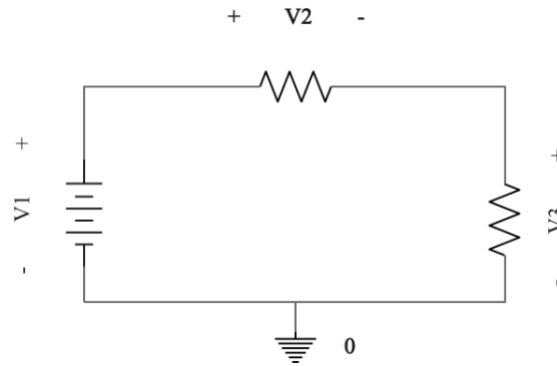
[Hint: $R_{eq} = R_1 + R_2 + \dots + R_N$]

4. Determine the equivalent resistance R_{eq} of the circuit below. (10 Marks)

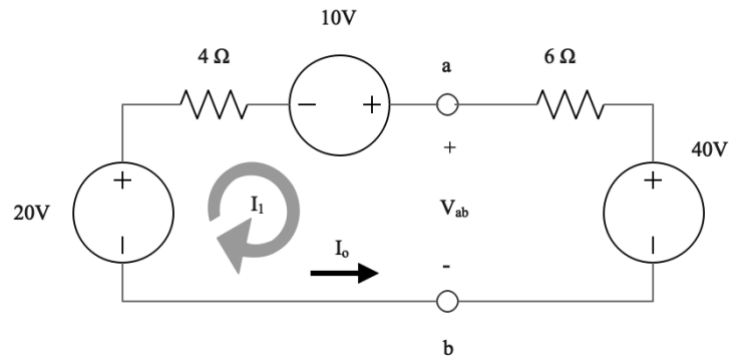
[Hint: $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_N}$]



5. Consider the circuit illustrated below. If $V_1 = +9V$ and $V_3 = +2V$, what does V_2 equal? (10 Marks)
[Hint: Use Kirchhoff's Voltage Law]



6. For the given circuit, calculate the current I_0 and voltage V_{ab} . (20 Marks)
[Hint: Apply Kirchhoff's Current law & Voltage Law]



7. Look at the circuit below,
(i) Use current division to find the current flowing from top to bottom in the $10\text{ k}\Omega$ resistor.
(ii) Using your result in (a), find the voltage drop across the $10\text{ k}\Omega$ resistor, positive at the top
[Hint: Apply current division, Ohm's Law]

