Homework 1

Due date: Sep. 27th, 2022, Tuesday

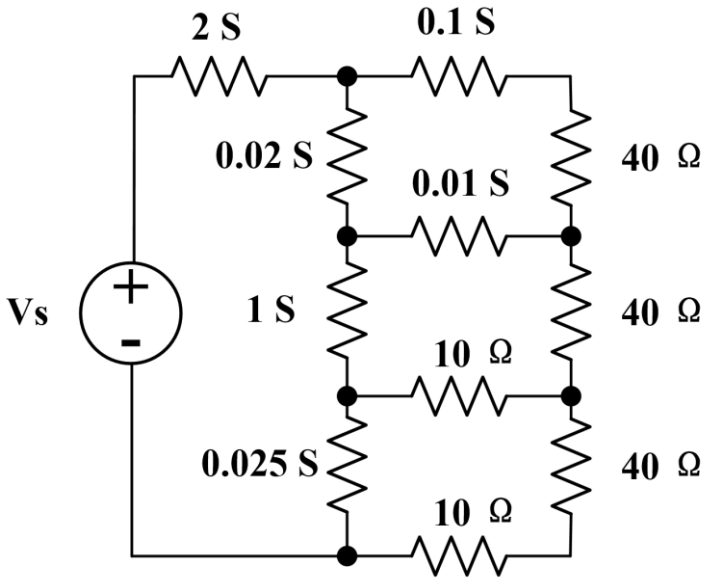
Turn in your hard-copy hand-writing homework in class

Rules:

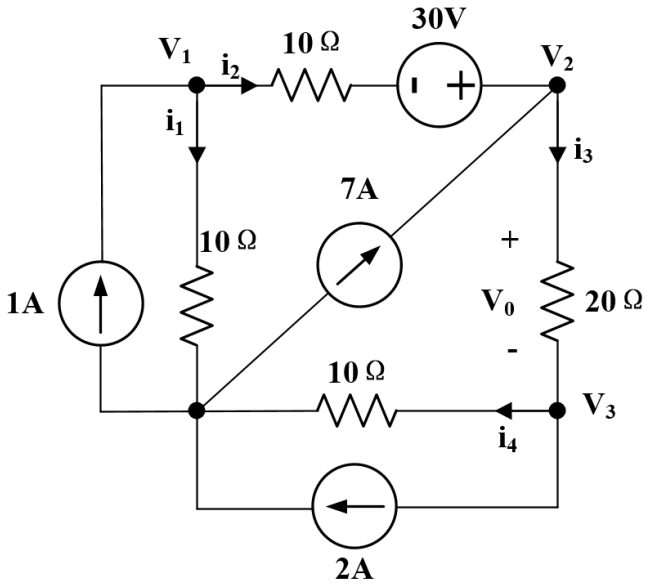
- Work on your own. Discussion is permissible, but extremely similar submissions will be judged as plagiarism.
- Please show all intermediate steps: a correct solution without an explanation will get zero credit.
- Please submit on time. No late submission will be accepted.
- Please prepare your submission in English only. No Chinese submission will be accepted.

1. (a) Find the resistance seen by the ideal voltage source **Vs** in the circuit.

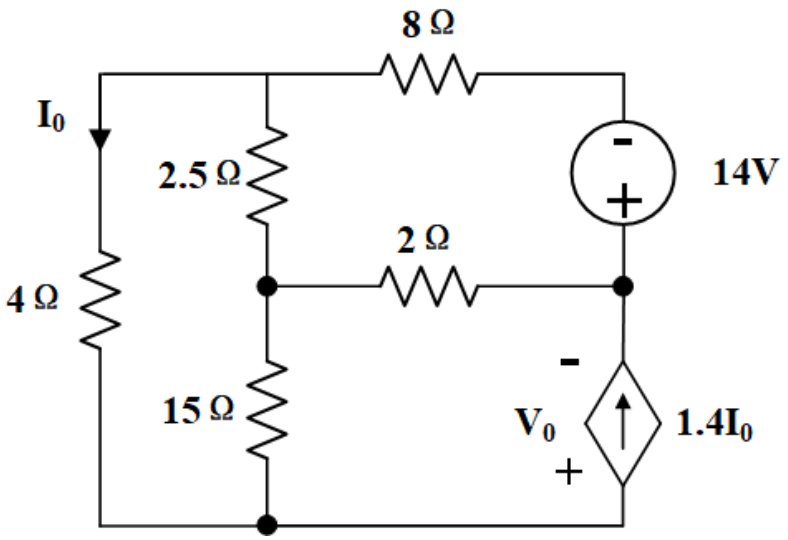
   (b) If **Vs** equals 270V, how much power is dissipated in the 1S resistor?



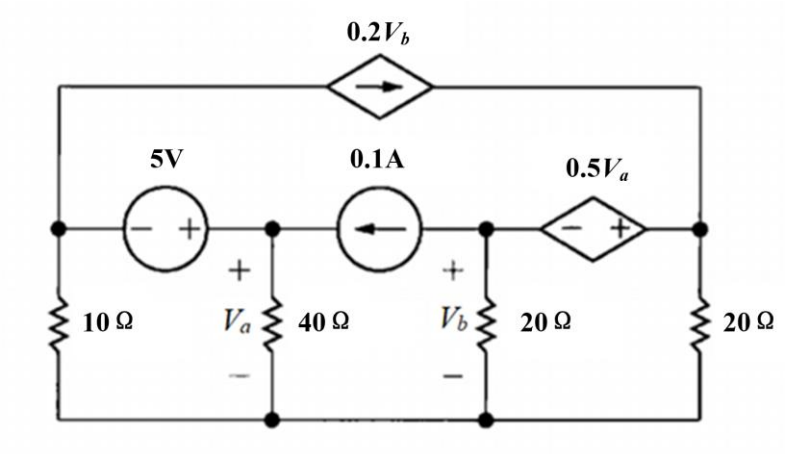
2. Apply nodal analysis method to obtain:
   (a) all the node voltages ($\mathbf{V_1}$, $\mathbf{V_2}$, and $\mathbf{V_3}$) if assuming the bottomleft node as the reference node.
   (b) all the currents ($\mathbf{i_1}$ to $\mathbf{i_4}$) and the voltage on 20Ω resistor ($\mathbf{V_0}$).



3. Apply mesh analysis method to obtain $\mathbf{I_0}$ and $\mathbf{V_0}$ in the following circuit.



4. For the circuit below,
   (a) apply nodal analysis method to find V_a, V_b.
   (b) apply mesh analysis method to find V_a, V_b.
   (c) find the power delivered by each source (2 current sources and 2 voltage sources).



5. For the circuit below, $\mathbf{R_1} = 1\Omega$， $\mathbf{R_2} = 2\Omega$，

(a) Apply nodal or mesh analysis method to find $\mathbf{i_1}$

(b) If disconnect the current source from the circuit, try to find the equivalent resistance of **the pure resistor network** between node **a** and **b**.