Homework 1

Due date: Oct. 9th, 2021

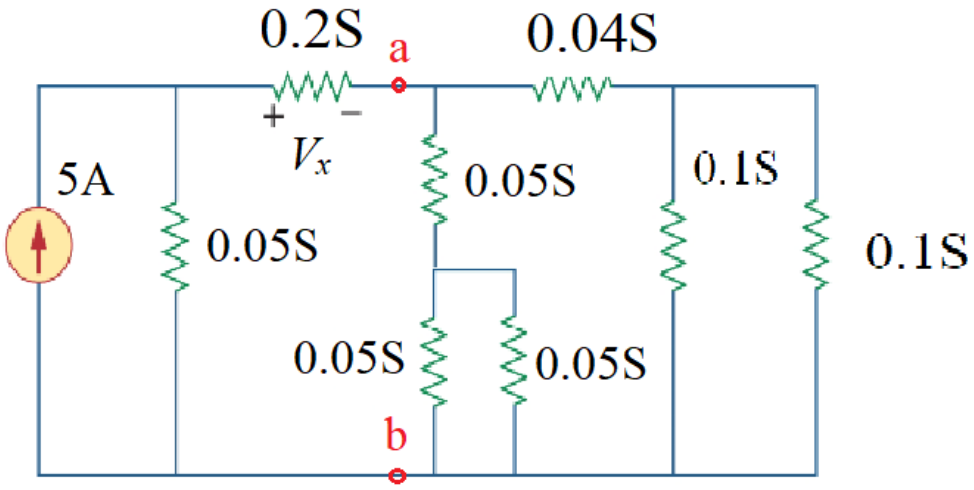
Turn in your homework in class

Rules:

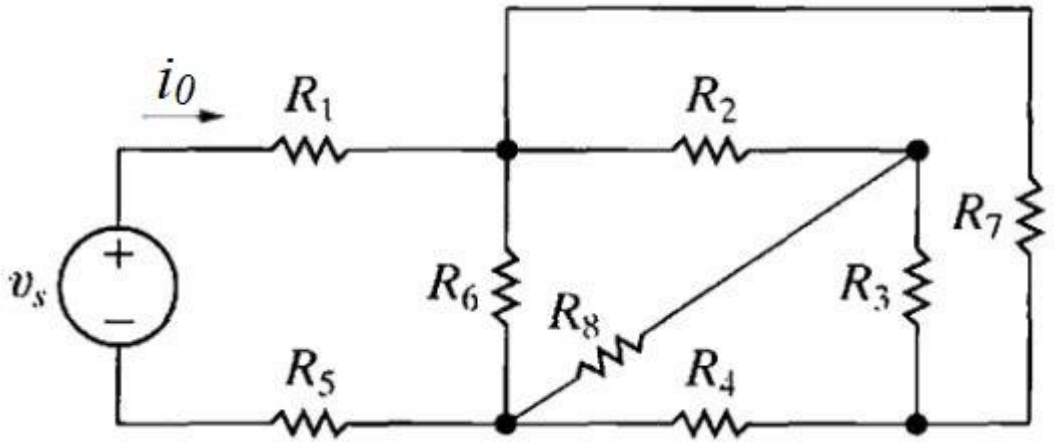
- Work on your own. Discussion is permissible, but extremely similar submissions will be judged as plagiarism.
- Please show all intermediate steps: a correct solution without an explanation will get zero credit.
- Please submit on time. No late submission will be accepted.
- Please prepare your submission in English only. No Chinese submission will be accepted.
- If needed, round the number to the nearest hundredths, i.e., rounding it to 2 decimal places.

1. In this task you are going to solve circuits with multiple resistors. It will be helpful if you can properly simplify the circuit using correct methods.

1.1 For the circuit below, find the equivalent resistance at the right part of the node a and b and calculate the V_x.



1.2 For the circuit below, where R_1=3Ω, R_2=20Ω, R_3=10Ω, R_4 =R_8=4Ω, R_5=6Ω, R_6=36Ω, R_7=20Ω, V_s=20V, find i_0.

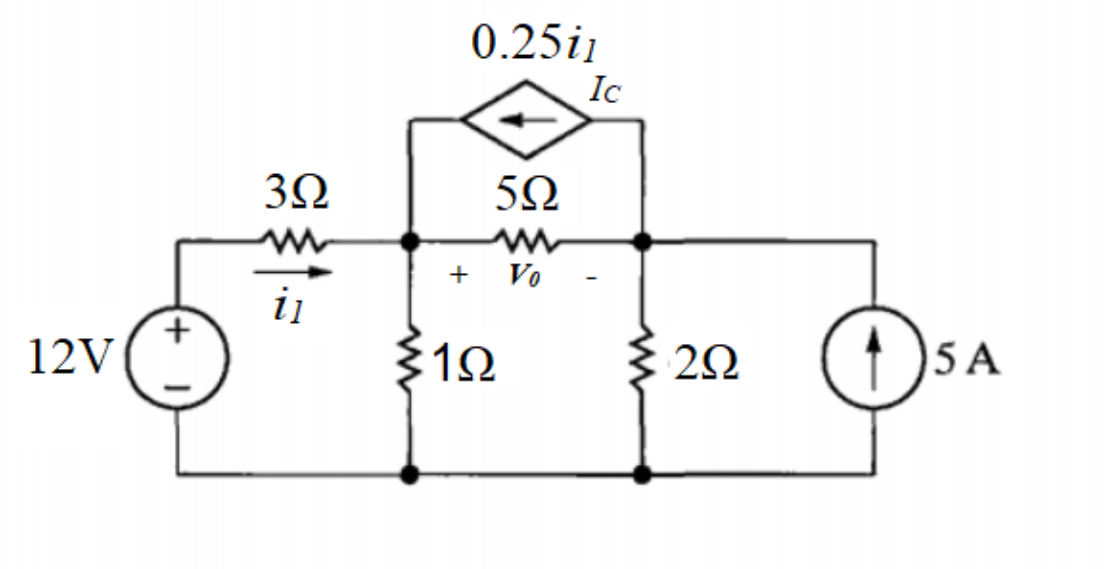


2. For the circuit below.

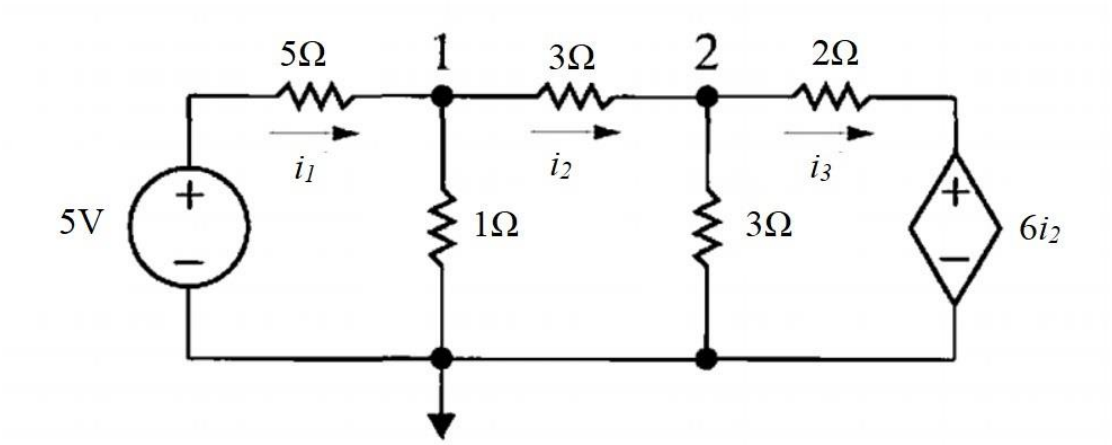
2.1 Apply nodal analysis to find i_1, V_0.

2.2 Calculate the power on the controlled source I_C.

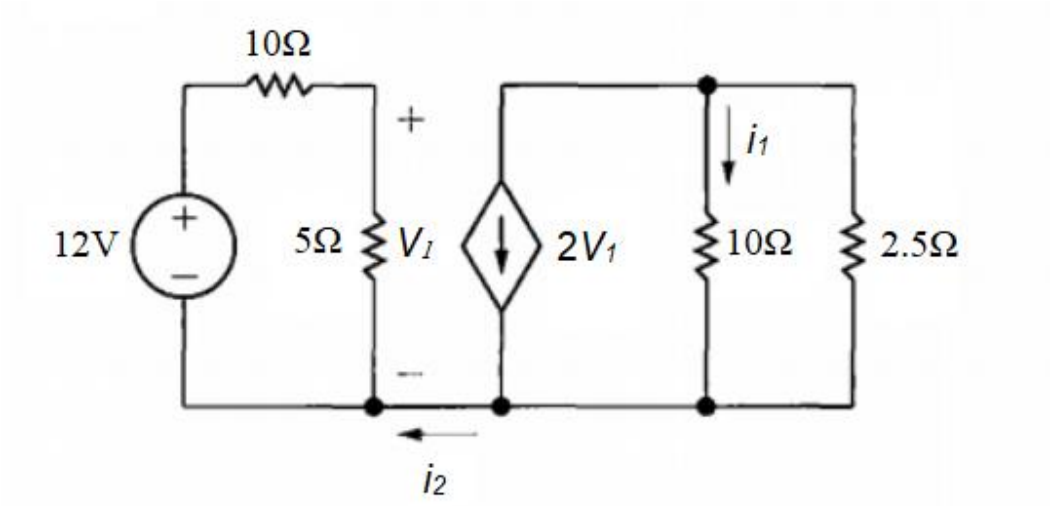
2.3 Determine whether the controlled source I_C dissipates power or releases power.



3. For the circuit below, apply mesh analysis to find i_1, i_2, i_3.



4. For the circuit below, apply either nodal or mesh method to find V_1, i_1, i_2.



5. For the circuit below,
   5.1 apply nodal analysis method to find V_a, V_b.
   5.2 apply mesh analysis method to find V_a, V_b.