Homework 1

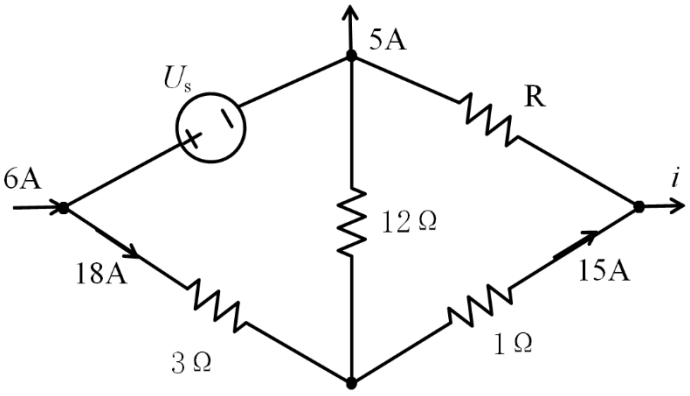
Due date: Oct. 19th, 2023

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

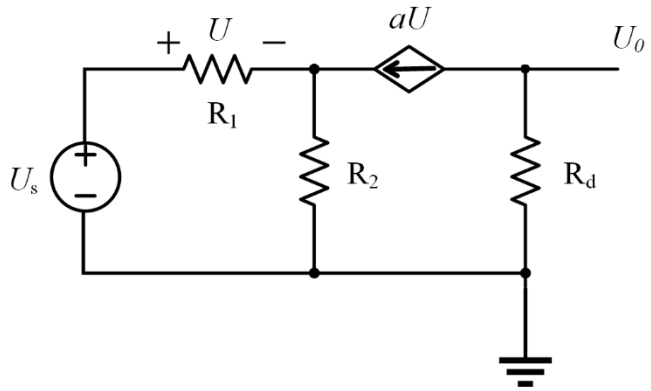
Rules:

- 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) Use Kirchhoff's law to find U_s and i.
   (b) Calculate resistance R.



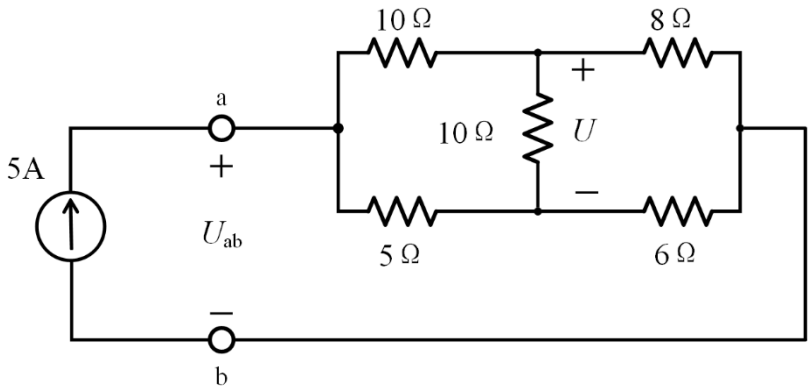
2. Use Kirchhoff's law to calculate U_o/U_s in terms of a, R_1, R_2, and R_d. Except for U, all other variables are known quantities.



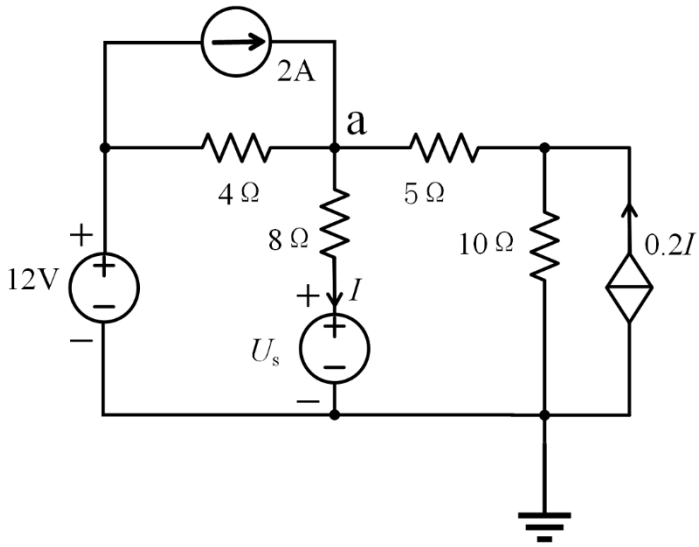
3. For the circuit below, using Δ-Y conversion

(a) Calculate the U.

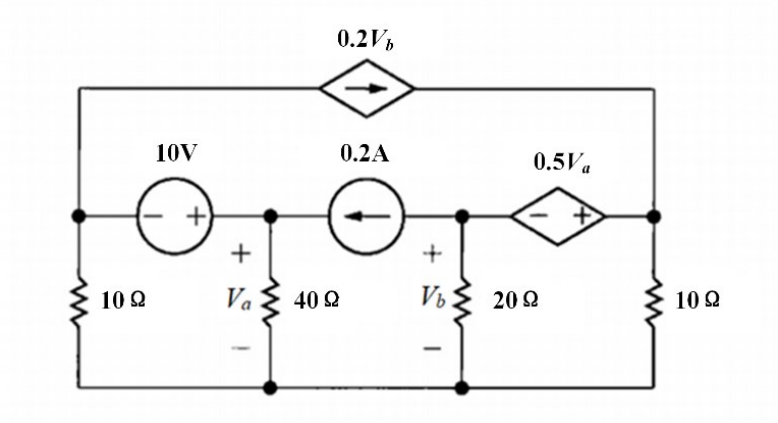
(b) Calculate the U_{ab}.



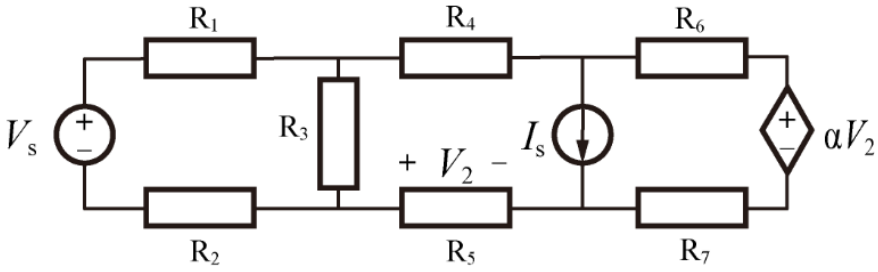
4. The node voltage U_a equals 15V, using nodal analysis method to obtain U_s and I.



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



6. Use mesh current analysis method, calculate the absorbed power of current source and voltage source, given $R_1 = R_2 = R_3 = R_4 = R_5 = R_6 = R_7 = 1\Omega$, $\alpha = 4$, $I_s = 1A$, $V_s = 1V$



7. $R_1 = R_2 = R_3 = R_4 = 10\Omega$, $\beta = 2$, use the mesh current method to find V_s/i