Homework 2

Due date: Oct. 31st, 2023

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

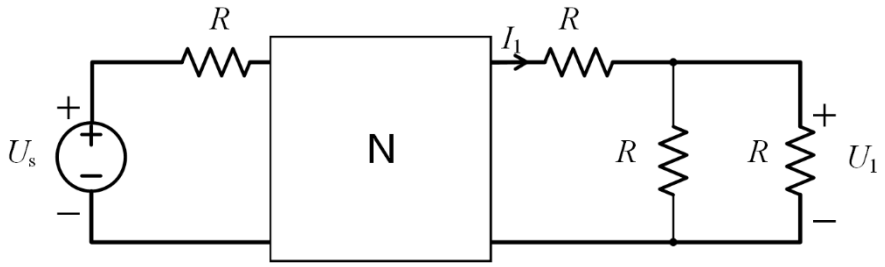
Rules:

- 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. N is a linear resistive network with sources inside.

When $U_s = 6V$, $I_1 = 1A$, $U_1 = 2V$; When $U_s = 10V$, $I_1 = 2A$.

Use linear property to find I_1 and U_1 if $U_s = 12V$.

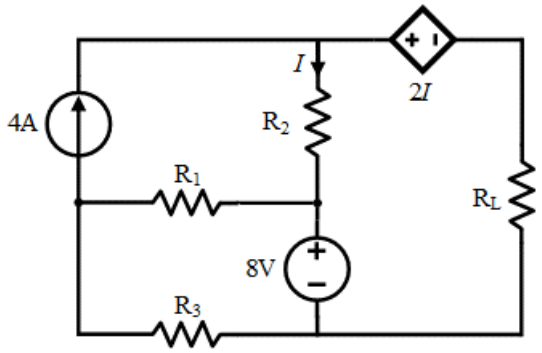


2. $R_1=R_2=2\Omega$，$R_3=1\Omega$，$R_L=2\Omega$

a. Calculate the current of R_L when an independent current source acts alone.

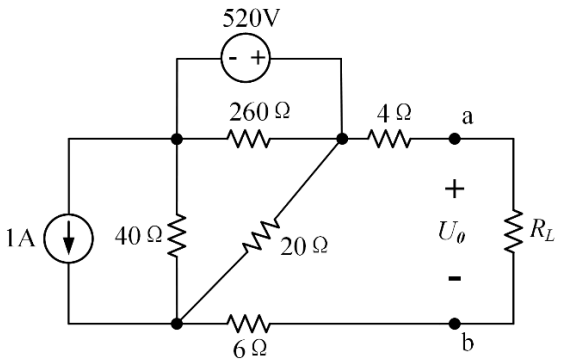
b. Calculate the current of R_L when an independent voltage source acts alone.

c. Calculate the current on R_L using the superposition theorem.

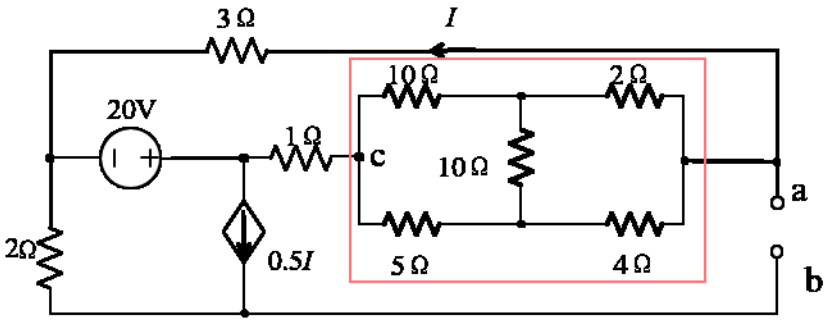


3. (a) Apply superposition to find U_0 in the circuit below when R_L=250Ω.

(b) Find the Thevenin equivalent circuit for the left hand side circuit of node a and node b.

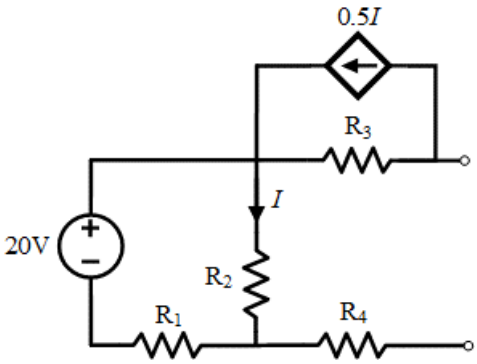


4. a. Find the equivalent resistance inside rectangle drawn with red lines.
   b. Find the Thevenin equivalent circuit between node **a and b**

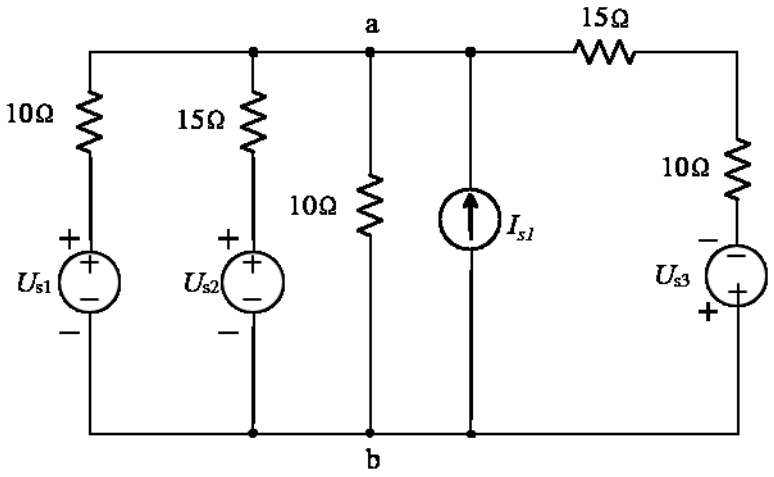


5. $R_1 = R_2 = R_3 = R_4 = 4\Omega$.

   Find the Norton equivalent circuit of the two port network.



6.U_{s1} = 20V, U_{s2} = 15V, U_{s3} = 25V, I_{s1} = 1A, using source transfer to calculate U_{ab}



7. $R_1 = 2\Omega$, $R_2 = 6\Omega$, $R_3 = 1\Omega$

a. Determine the value of R_L when maximum power could be transferred to it, and calculate the maximum power P_{RL}.

b. Calculate the ratio of P_{RL} to the output power of the independent voltage source.