

Homework 2

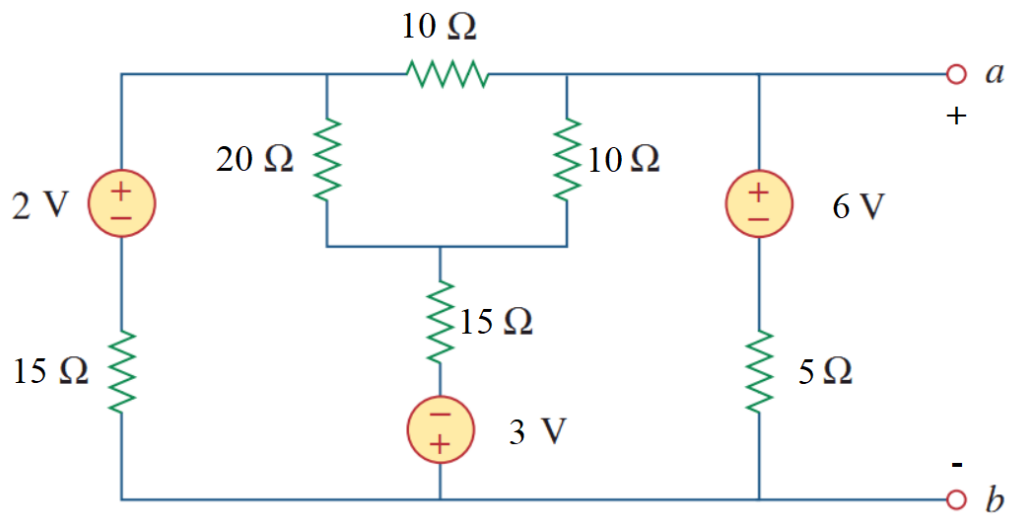
Due time: 18:30 Oct. 14th, 2021

Turn in your homework in class or in tutorial session (Room 1B110)

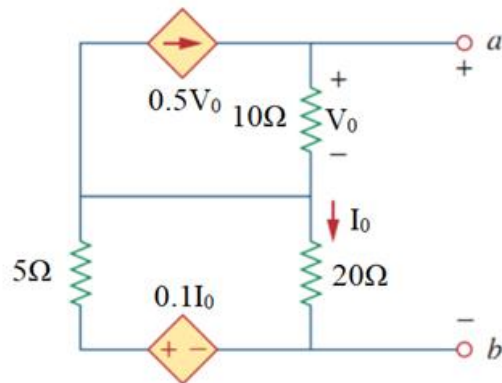
Rules:

- 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.

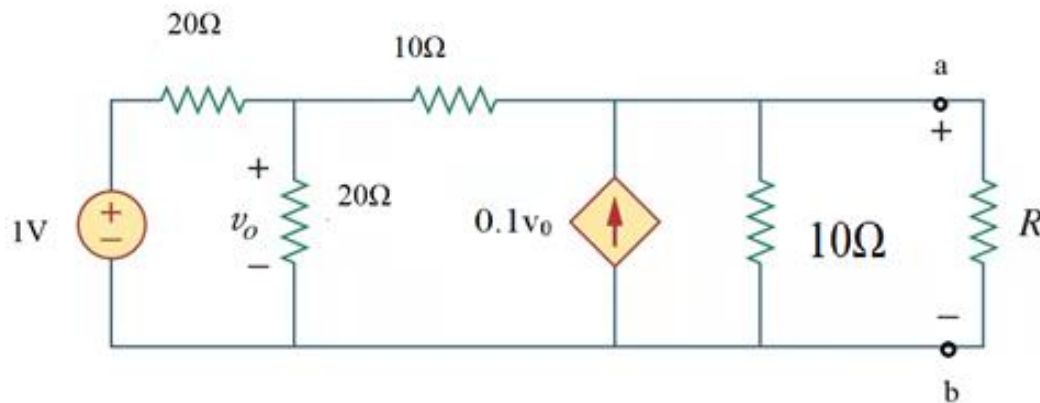
- 1) In the circuit below,
- 1.1 Use superposition to find the voltage between terminals *a* and *b*.
- 1.2 Find Thevenin equivalent circuit between terminals *a* and *b*.



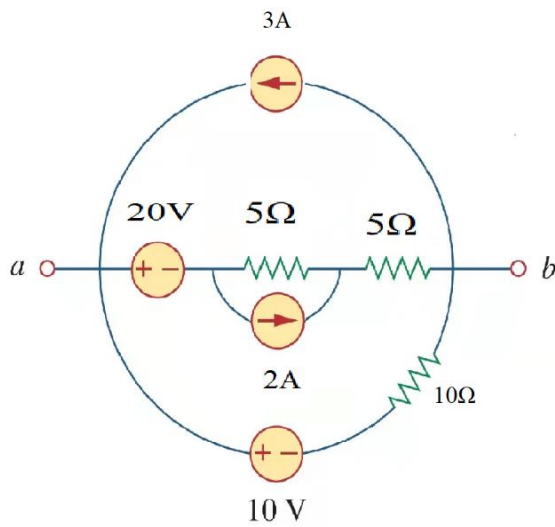
- 2) For the circuit below, find the Thevenin equivalent circuit *at the terminals a and b*.



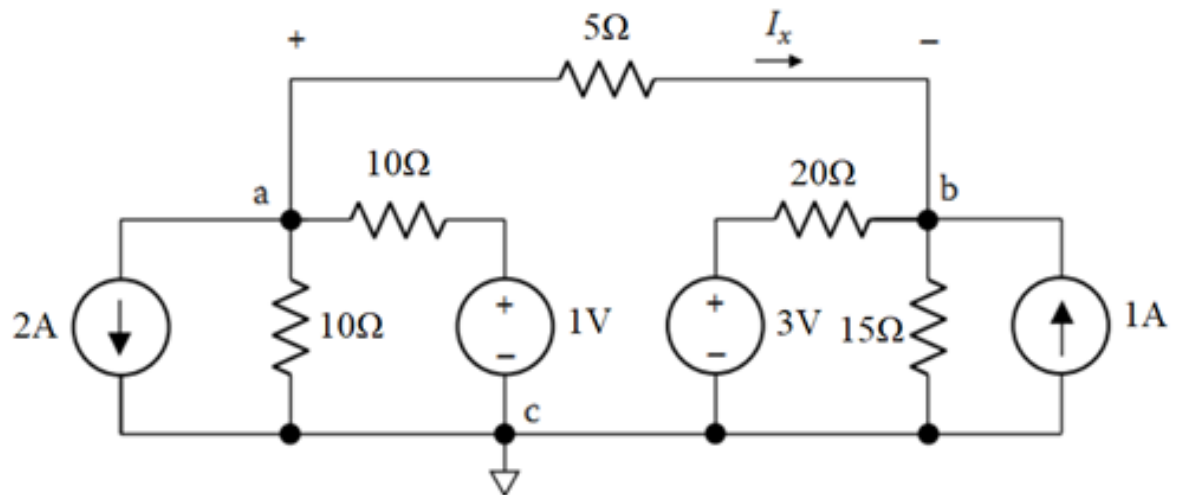
- 3) For the circuit below, the resistor R at the rightmost is regarded as a load.
- 3.1 Find the Norton equivalent circuit at **terminals a, b , excluding the load R** .
- 3.2 Find the value of R that maximum power could be transferred to the resistor R .
- 3.3 In the case of 3.2, calculate the maximum power.
- 3.4 In the case of 3.2, find the power transfer efficiency from the voltage source to the load R .



- 4) For the circuit below,
- 4.1 Use source transformation to find open circuit voltage V_{ab} .
 - 4.2 Find the Thevenin equivalent circuit *at terminals a, b*.
 - 4.3 Find the Norton equivalent circuit *at terminals a, b*.



- 5) For the circuit below, the top 5-ohm is regarded as a load.
- 5.1 Find Thevenin equivalent circuit *at terminals a and b*. (Hint: you may use source transformation)
- 5.2 Find I_x
- 5.3 Replace the 5 Ω resistor with a variable *resistor R*. Calculate the value of R that maximum power could be transferred and find the maximum power.



- 6) For the circuit below, R is regarded as a load.
- 6.1 Find the Thevenin equivalent circuit at the left side of *the terminals a and b*.
- 6.2 Calculate maximum power that could be transferred to R .
- 6.3 Based on the condition of 6.2, find V_ϕ .

