ID:	Name:

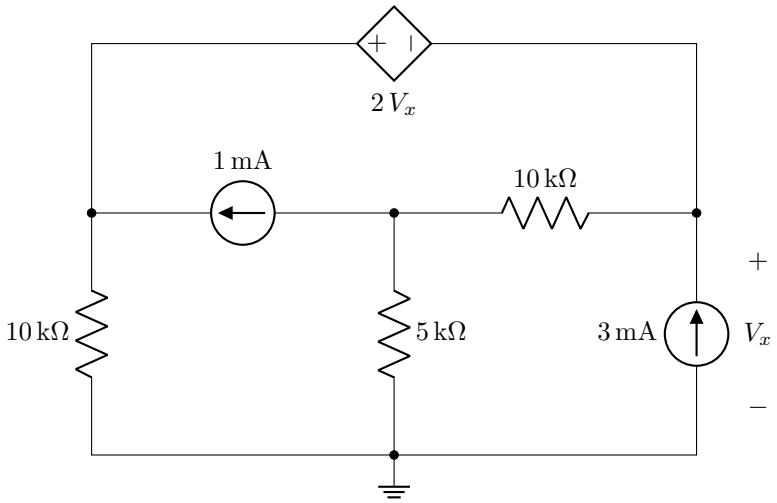
Set
A

Brac University
Semester: Fall 2024
Course Code: CSE250
Circuits And Electronics

Assessment: *Midterm Exam*
Duration: 1 hour 10 minutes
Date: November 27, 2024
Full Marks: 44

- ✓ No washroom breaks. Phones must be turned off. Using/carrying any notes during the exam is not allowed.
- ✓ At the end of the exam, both the **answer script** and the **question paper** must be returned to the invigilator.
- ✓ All **3 questions** are compulsory. Marks allotted for each question are mentioned beside each question.
- ✓ Symbols have their usual meanings.

■ Question 1 of 3 *[CO3] [16 marks]*

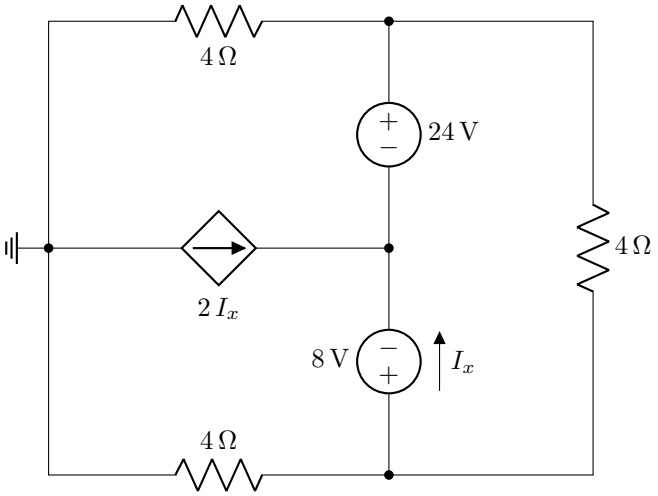


Apply Nodal/Mesh analysis to answer the following questions–

(a) ***[12 marks]*** Find all the node voltages/mesh currents in the circuit shown above.†† Note that, depending on the analysis method you apply, you have to determine either the mesh currents or the node voltages, not both.

(b) ***[4 marks]*** Determine the power of the the $2\,V_x$ dependent voltage source with appropriate ± sign and unit. Also mention, whether the source is supplying or absorbing power.

■ Question 2 of 3 *[CO3] [16 marks]*



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(a) ***[12 marks]*** Find all the node voltages/mesh currents in the circuit shown above.†† Note that, depending on the analysis method you apply, you have to determine either the mesh currents or the node voltages, not both.

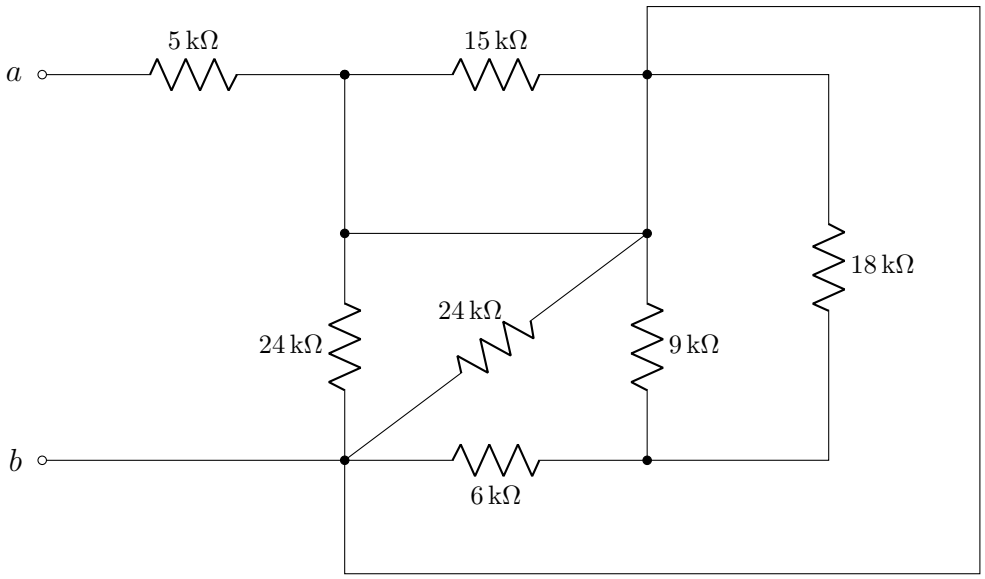
(b) ***[1 mark]*** Which side (top or bottom) of the 4 Ω resistor on the right has a higher voltage?

(c) ***[3 marks]*** Determine the voltage across the $2\,I_x$ dependent current source.

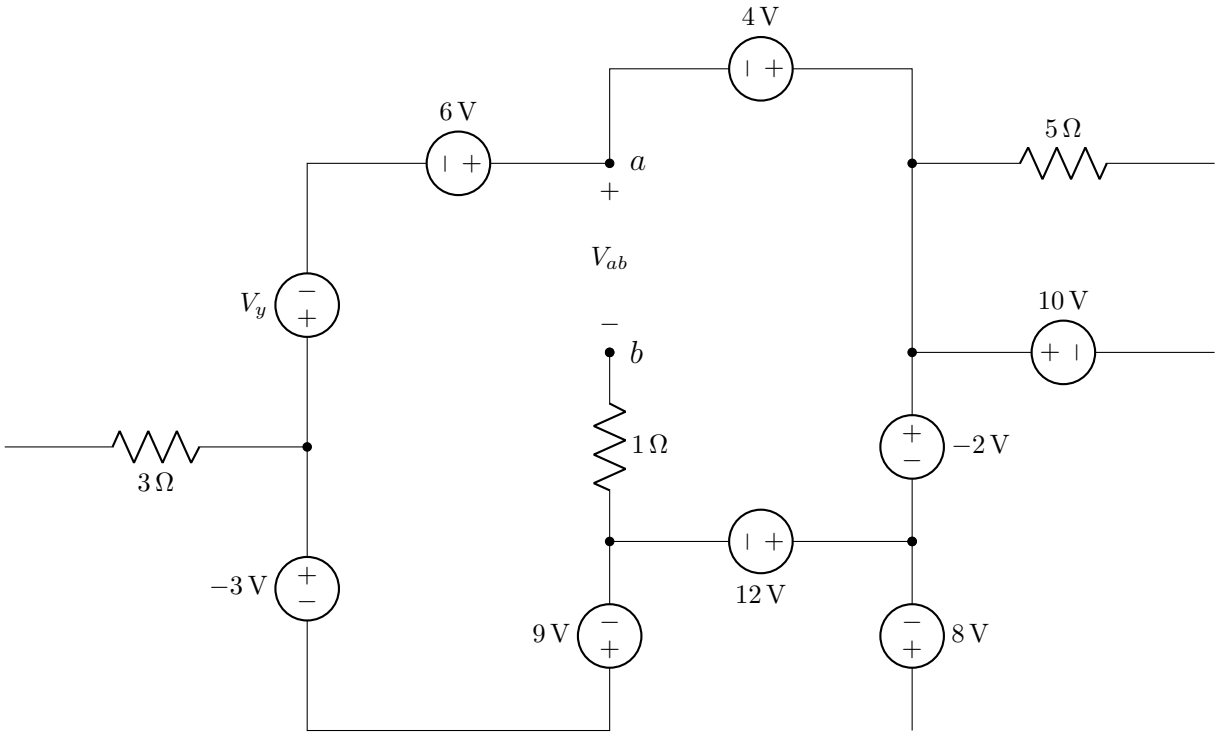
†† Node voltage/mesh current variables must be labeled on the diagram

■ Question 3 of 3 *[CO3, CO1] [12 marks]*

(a) ***[6 marks]*** Determine R_{ab}, the equivalent resistance between the terminals a and b in the circuit shown below.



(b) The following circuit consists of only <u>one</u> loop.



Apply KVL to answer the following questions–

(i) ***[3 marks]*** Identify the loop and determine the value of V_y required to satisfy KVL along the loop.

(ii) ***[3 marks]*** What is the voltage V_{ab} across the *open* terminals a and b.

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Set **B**

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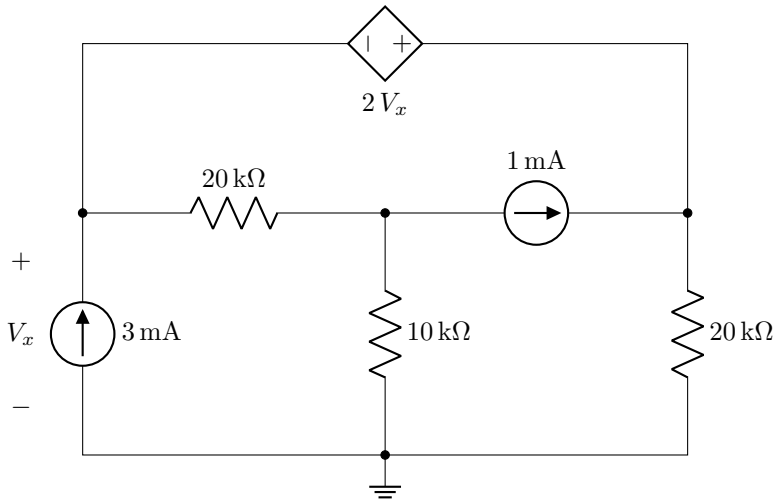

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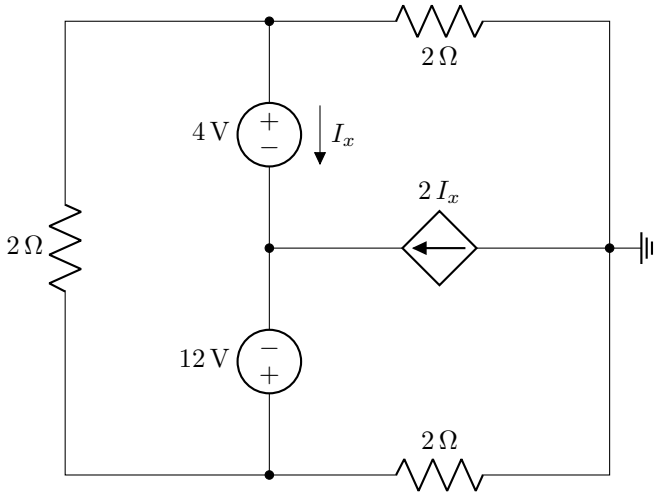

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(b) ***[1 mark]*** Which side (top or bottom) of the 2 Ω resistor on the left has a higher voltage?

(c) ***[3 marks]*** Determine the voltage across the $2\,I_x$ dependent current source.

†† Node voltage/mesh current variables must be labeled on the diagram

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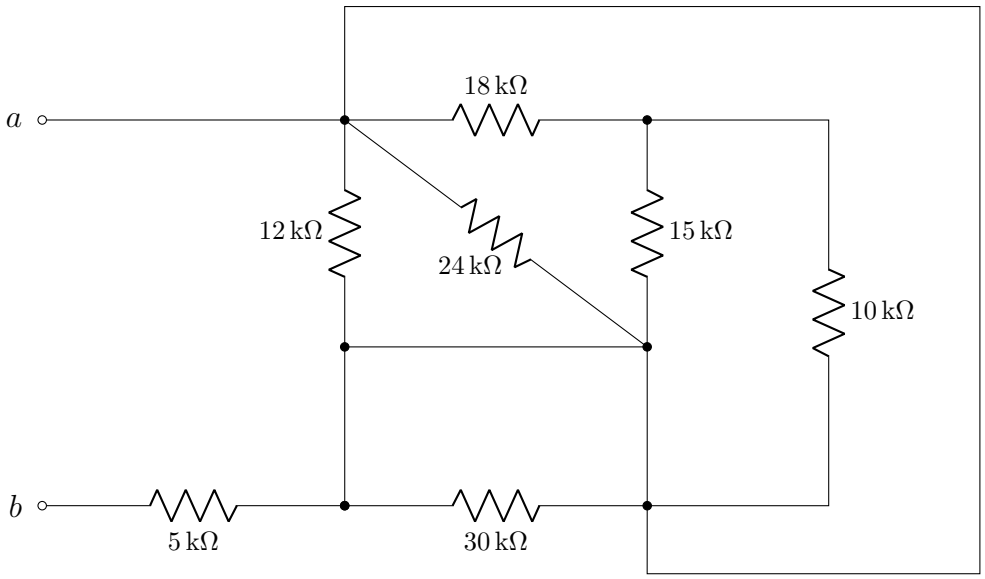

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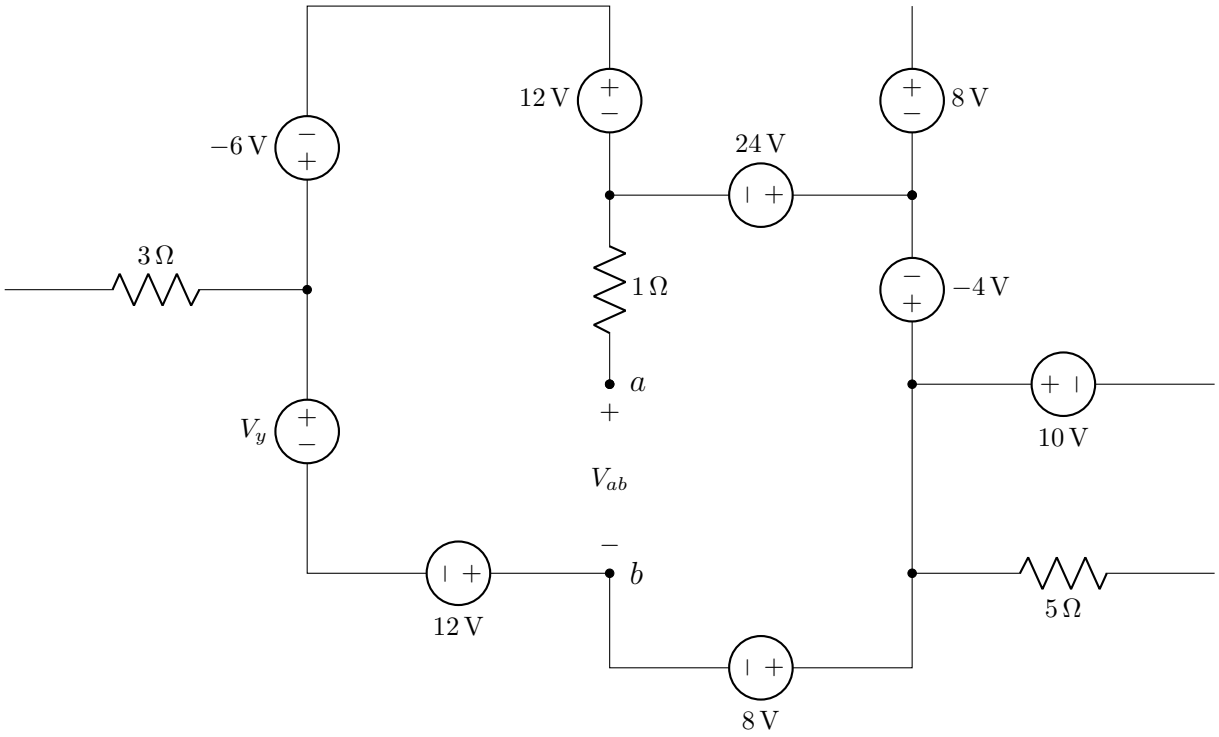

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