ID:	Name:

Brac University

Set: 1

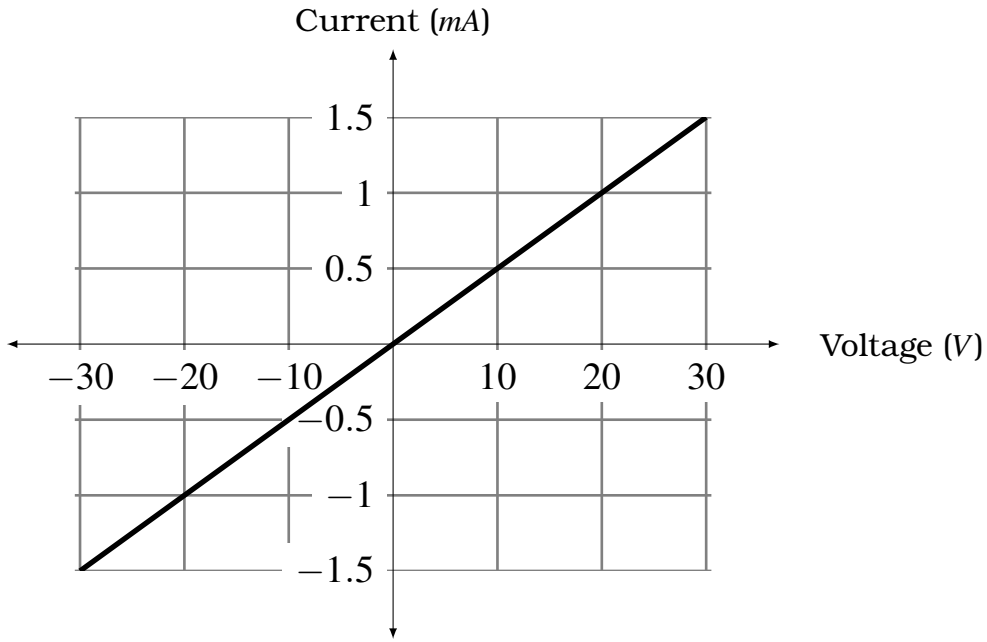
Semester: Fall 2022
Course No: CSE250
Course Title: CIRCUITS AND ELECTRONICS
Date: November 11, 2022

Midterm Exam
Full marks: 50 (+5 Bonus)
Duration: 1 hour 15 minutes

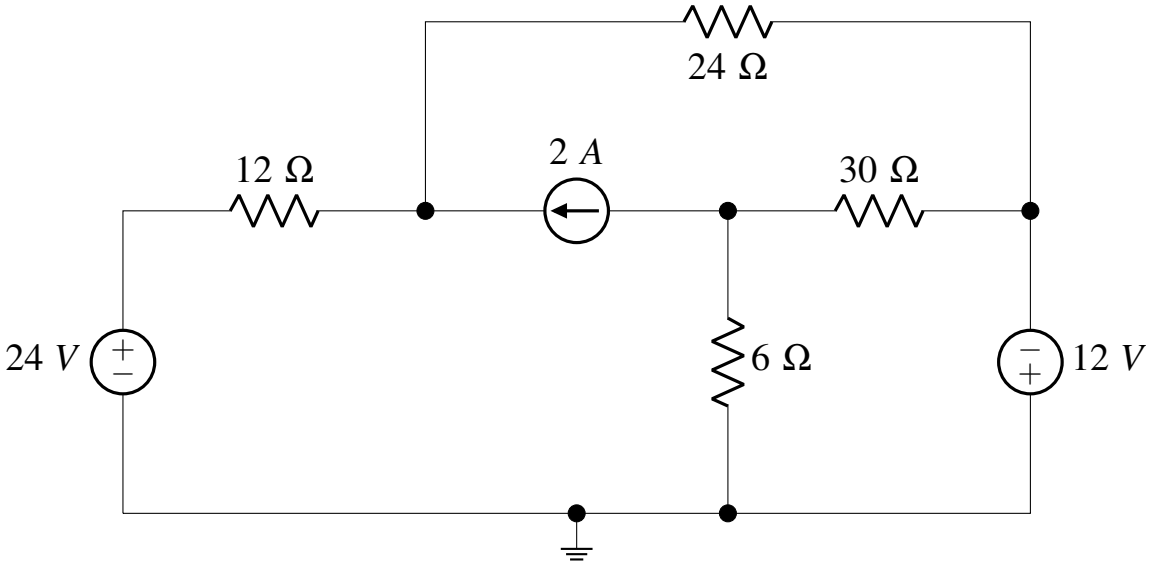
All the questions are mandatory. *Numbers inside box brackets indicate marks.*

Question 1 of 3 *[20 marks]* [CO1, CO2, CO4]

Part A: The plot below shows the current response of a resistor when different voltages are applied across it. **Determine** the value of the resistor from the plot. Show calculation. [2]



Part B: Consider the circuit shown below.

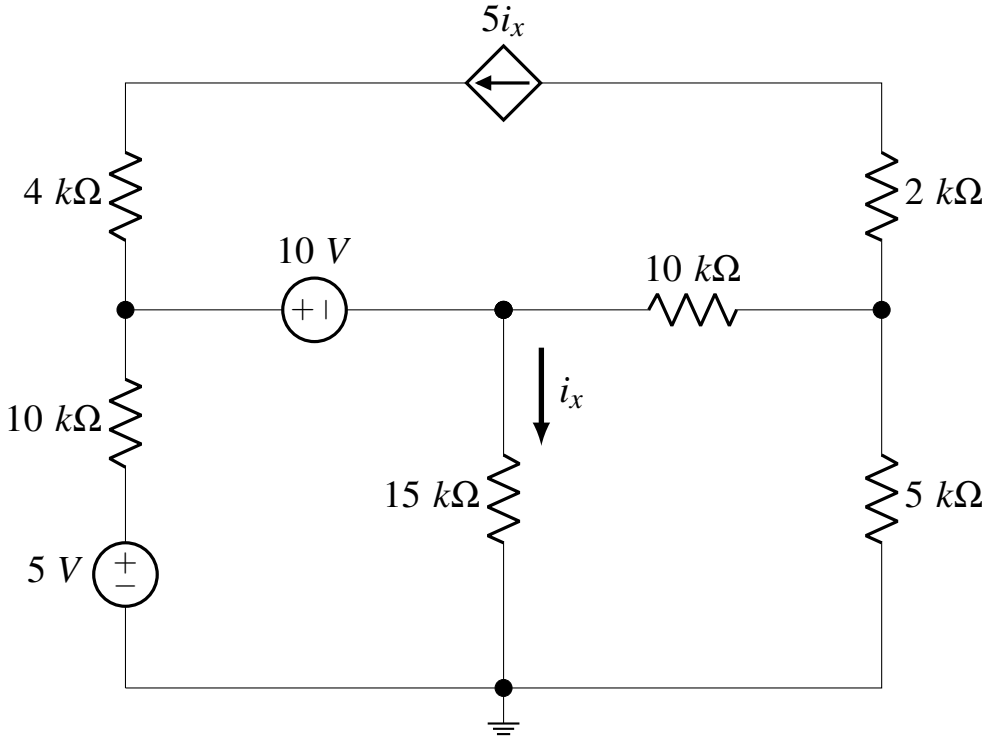


(i) **Apply Nodal/Mesh Analysis** to **identify** the values of the node voltages/mesh currents. *(Equations must be highlighted using boxes).* [14]

(ii) **Determine** the power supplied/absorbed by the current source (with appropriate ± sign). [4]

Question 2 of 3 *[20 marks]* [CO2, CO4]

Consider the circuit shown below.



(i) **Apply Nodal/Mesh Analysis** to **identify** the values of the node voltages/mesh currents. *(Equations must be highlighted using boxes).* [16]

(ii) **Determine** i_x and the current through the 10 V voltage source. [2+2]

Question 3 of 3 *[15 marks]* [CO2, CO3, CO4]

Part A: The two equations below are derived by applying KVL to a linear circuit. [3]

$$-12 + 2I_2 + 4(I_2 - I_1) = 0 \quad \text{.....}(i),$$

$$4(I_2 - I_1) + 8 + 6I_1 = 0 \quad \text{.....}(ii),$$

where I_1 and I_2 are the loop currents, in ampere units. **Draw** the circuit and label the component values appropriately.

Part B: Use **Source Transformation** to **analyze** the circuit shown below. **Determine** V_0. [12]