International University - VNUHCM
School of Electrical Engineering

Midterm Examination

Date: November 15, 2023; Duration: 90 minutes
Close book; **Offline,** One note (A4 size) is allowed**.**

SUBJECT: Name of course (ID: EE051IU) Principles of Electrical Engineering I	
Approval by the School Signature Full name: Vo Tan Phuoc	Lecturer: Signature  Full name: Tran Van Su
Proctor 1 Signature Full name:	Proctor 2 Signature Full name:
STUDENT INFO	
Student name: **Student ID:**	

INSTRUCTIONS: the total of point is 100 (equivalent to 30% of the course)

1. *Purpose:*
   - Test your knowledge in understanding circuit variables, and resistive circuits (G1.1)
   - Test your knowledge in understanding the fundamental of techniques of circuit analysis in DC (G1.2)
   - Examine your skill in applying the techniques of circuit analysis to solve electrical circuits with DC sources. (G2.1)
2. *Requirement:*
   - Read carefully each question and answer it following the requirements.
   - Write the answers and draw models CLEAN and TIDY directly in the exam paper.

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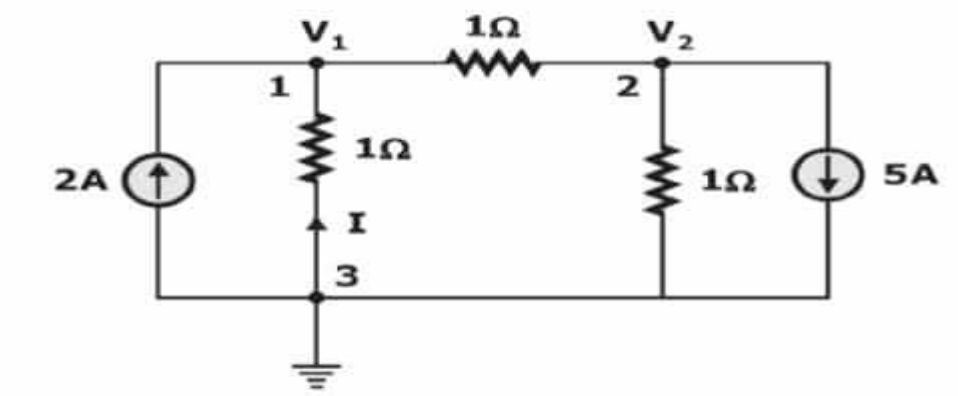
Student Name:……
Student ID:……

QUESTIONS

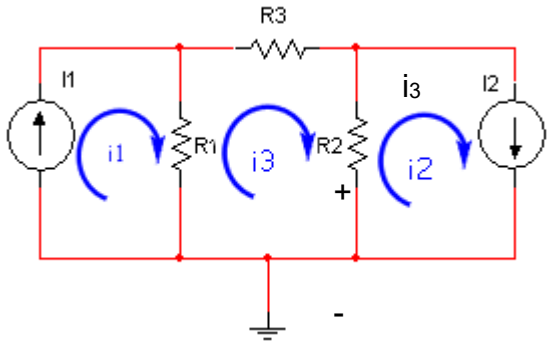
Question 1 (20 Marks)



a. Use node-voltage method to find the voltage at nodes 1 and 2. (10 Marks)
b. Determine the current I. (5 Marks)
c. Compute the power of the current source 5A. (5 Marks)

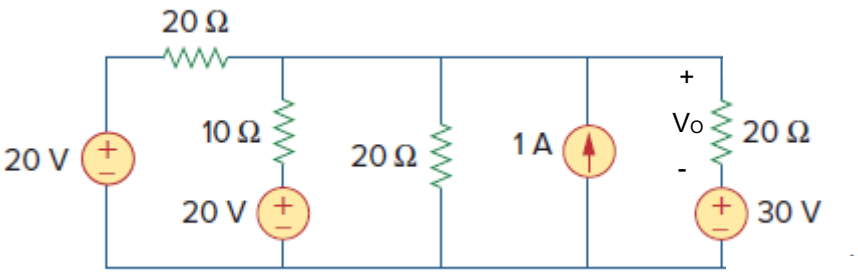
Question 2 (20 Marks)

In the circuit shown below, $I_1 = 1(A)$, $I_2 = (2A)$, $R_1 = 2\Omega$, $R_2 = 1(\Omega)$ and $R_3 = 4(\Omega)$.



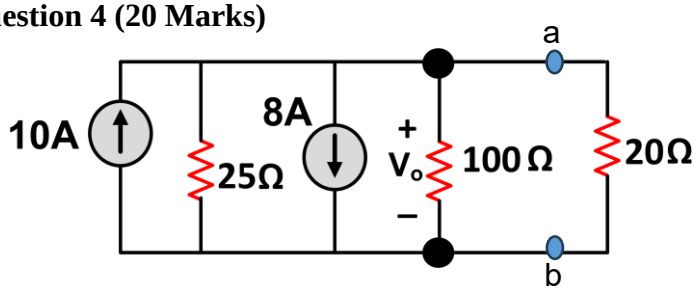
a. Use mesh-current method to find i_1, i_2, and i_3. (10 Marks)
b. Compute the power of the current source I_1. (5 Marks)
c. Calculate total power dissipated in all resistors in the circuit. (5 Marks)

Question 3 (20 Marks)



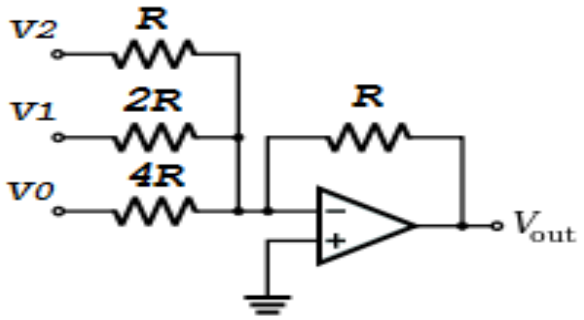
a. Use source transformation to find V_o. (10 Marks)
b. What is the power of the voltage source 30 V. (10 Marks)

Question 4 (20 Marks)



a. Find Thevenin equivalent circuit at terminal a,b. (10 Marks)
b. Compute the power dissipated in 20 Ω resistor using Thevenin equivalent circuit in (a). (5 Marks)
c. Is the maximum power of the source transferred to 20Ω? Explain your answer? (5 Marks)

Question 5 (20 Marks)



It is given that the power supplies for the opamp in the circuit are $+V_{CC}$ = 12V and $-V_{CC}$ = -12V.

a. Find V_{out} if V_o = 3V, V_1 = 1V and V_2 = 0.5V. (10 Marks)
b. Find the range of V_2 to avoid amplifier saturation if V_o = 3V, V_1 = 1V. (5 Marks)
c. What is V_{out} if $V_o = V_1 = V_2$ = 8V. (5 Marks)

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