

SIMON FRASER UNIVERSITY
SCHOOL OF ENGINEERING SCIENCE

Fall 2025
ENSC 220: ELECTRIC CIRCUITS I

Midterm Examination No. 2
Tuesday, November 18, 2025

Duration: 110 minutes. Attempt all problems. Questions are not equally weighted. Closed book and closed notes. Programmable calculators, PDAs, laptops, and wireless phones are not permitted. Please write legibly. Illegible text will not be graded.

1. **(20 points)** For the circuit shown in Figure 1, find:
 - (a) Thévenin equivalent circuit.
 - (b) Norton equivalent circuit.
 - (c) If a load resistor R_L is attached across the output terminals A and B , calculate the value of R_L for which the load absorbs maximum power.
 - (d) Calculate the maximum power transferred to the load.
2. **(10 points)** Model of the op-amp shown in Figure 2 is ideal. Find the output voltage V_o in the circuit.
3. **(30 points)** For the circuit shown in Figure 3:
 - (a) Find current $i(t)$ when the switch is in position A .
 - (b) Assume that the switch has been in position A for a long time. Find the value of $i(t)$.
 - (c) At time $t = 0$ the switch moves from position A to position B . Find current $i(t)$ when the switch is in position B .
4. **(40 points)** In the circuit shown in Figure 4, the switch S has been in position A for a long time and it is moved to position B at $t = 0$.
 - (a) Find $v_C(0-)$ and $i_L(0-)$.
 - (b) Find $v_C(t)$ for $t \geq 0$.
 - (c) Find $i_L(t)$ for $t \geq 0$.
 - (d) Find $v_C(t)$ and $i_L(t)$ for $t \rightarrow \infty$.

Figure 1:

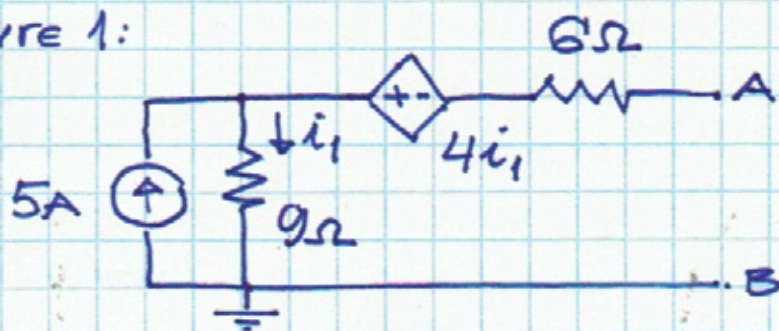


Figure 2:

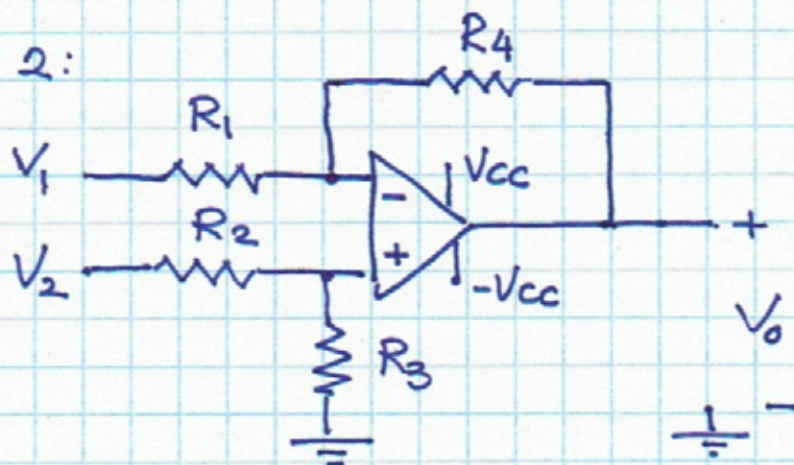


Figure 3:

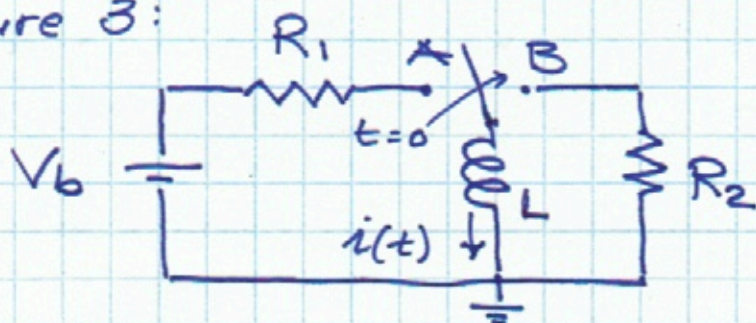


Figure 4:

