

SIMON FRASER UNIVERSITY
SCHOOL OF ENGINEERING SCIENCE

Fall 2001
ENSC 220
ELECTRIC CIRCUITS I

Midterm Examination
October 25, 2001

*Attempt all four problems.
Problems are not equally weighted.*

1. **(15 points)** The Wheatstone bridge circuit is shown in Figure 1. The bridge circuit is said to be balanced if the voltage $V_{out} = 0$ for any voltage V_{in} . Find the relationship among R_a , R_b , R_c , and R_d if the bridge is balanced.
2. **(15 points)** Find v_d for the circuit shown in Figure 2.
3. **(30 points)** Find the equivalent resistance seen at the terminals A-B of the circuit shown in Figure 3.
4. **(40 points)** Determine the Thévenin equivalent seen at the terminals A-B of the circuit shown in Figure 4. Assume that the op amp is ideal.

Figure 1.

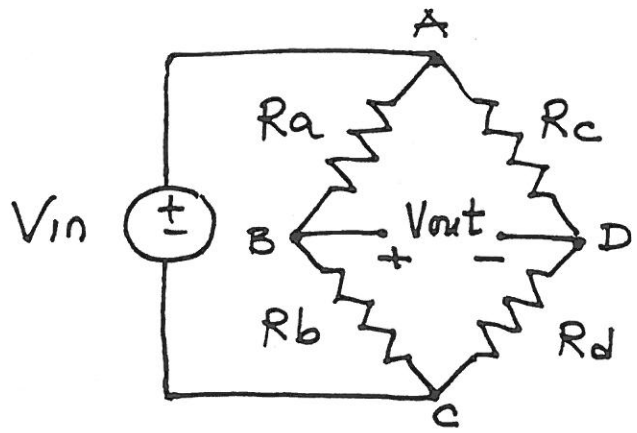


Figure 2.

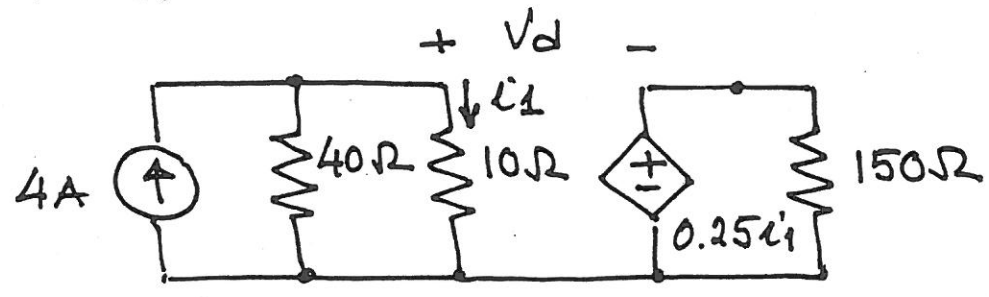


Figure 3.

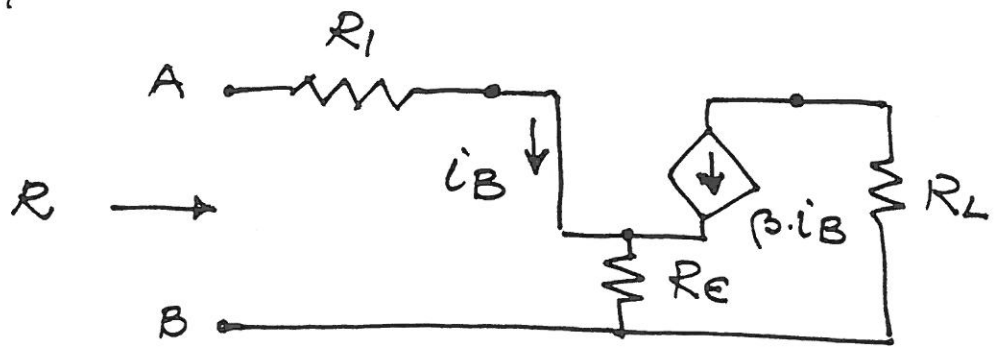


Figure 4.

