

# EECE 2150 - Electrical Engineering Fall 2021

## Quiz 4

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Student Name: \_\_\_\_\_

Find the Thévenin equivalent circuit for this circuit, which I wish to connect to a load resistor,  $R_L$  as shown.  $V_s = 12\text{ V}$ ,  $i_s = 6\text{ mA}$ ,  $R_1 = 10\text{ Ohms}$ ,  $R_2 = 3\text{ Ohms}$ ,  $R_3 = 10\text{ Ohms}$ , and  $R_4 = 3\text{ Ohms}$ .

1. What is the Thévenin voltage? Hint: Use superposition.

$V_T =$  \_\_\_\_\_ Volts

2. What is the Thévenin resistance?

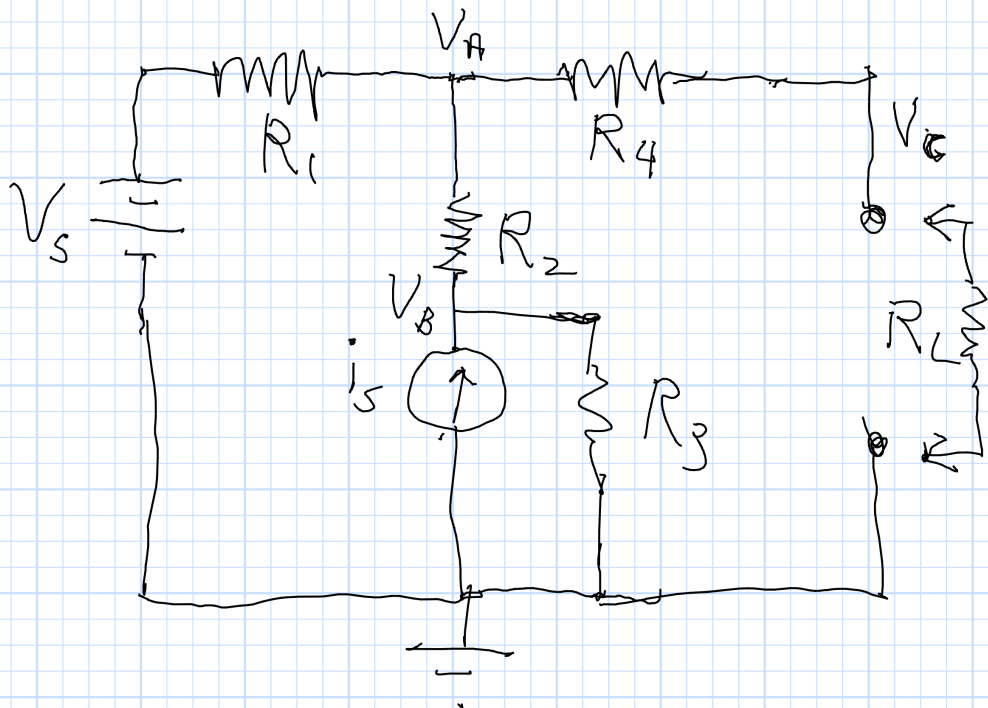
$R_T =$  \_\_\_\_\_ Ohms

3. What voltage would appear across the load if it is  $R_L = 1\text{ kOhms}$ ?

$V_L =$  \_\_\_\_\_ Volts

4. In that case, what would be the power in the load?

$P =$  \_\_\_\_\_ Watts



1. What is the Thévenin voltage?

Voltage source only:

$$V_T = V_s \frac{R_2 + R_3}{R_1 + R_2 + R_3} = 6.78 \text{ Volts}$$

Current source only

$$v_B = i_s [R_3 \parallel (R_1 + R_2)], V_T = v_B \frac{R_1}{R_1 + R_2} = 0.28 \text{ Volts}$$

Total:  $V_T = 6.81 \text{ Volts}$

2. What is the Thévenin resistance?

Zero the sources and  $R_T = R_4 + [R_1 \parallel (R_2 + R_3)] = 8.65 \text{ Ohms}$

3. What voltage would appear across the load if it is  $R_L = 1 \text{ kOhms}$ ?

$$V_L = V_T \frac{R_L}{R_T + R_L} = 6.75 \text{ Volts}$$

4. In that case, what would be the power in the load?

$$P = V_L^2 / R_L = 0.046 \text{ Watts or } 46 \text{ mW.}$$