1. Find the Thevenin equivalent circuit at terminals a-b.

2. Find the Thevenin equivalent circuit at terminals a-b. \( v_x \) must not appear in your solution. The expression must not contain more than circuit parameters \( \alpha, R_1, R_2, R_3, \) and \( i_s \). Note: \( 0 < \alpha < 1 \).

3. Make at least one consistency check (other than a units check) on your expression for problem 2. In other words, choose component values that make the answer obvious, and verify that your answer to problem 2 gives that obvious answer. State the values of resistors and sources for your consistency check.

5.

a) Calculate the value of $R_L$ that would absorb maximum power.

b) Calculate that value of maximum power $R_L$ could absorb.
Answers:
1. \( v_{Th} = 10.5 \text{ V}, \quad R_{Th} = 2.25 \text{k}\Omega \)
2. \( v_{Th} = i_s \cdot (R_1 + R_2) \parallel R_3 \parallel \frac{-R_3}{\alpha} = i_s \cdot R_{Th} \)

5.a. Hints: Remove \( R_L \) when finding the Thevenin equivalent, and 20 \( \Omega \) resistor in series with current source is irrelevant. So if you combine the 40 \( \Omega \) and 60 \( \Omega \), you are starting with a Norton form.

5.b. \( p_{\text{max}} = \frac{v_{Th}^2}{4R_{Th}} = 24 \text{ W} \)