The Ohio State University
Department of Electrical Engineering

ECE 205

Circuit Analysis
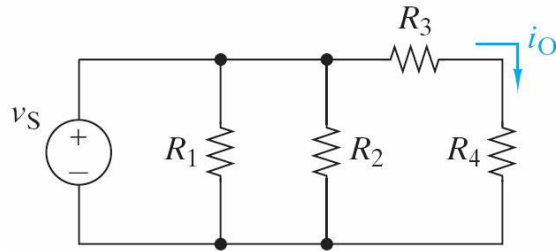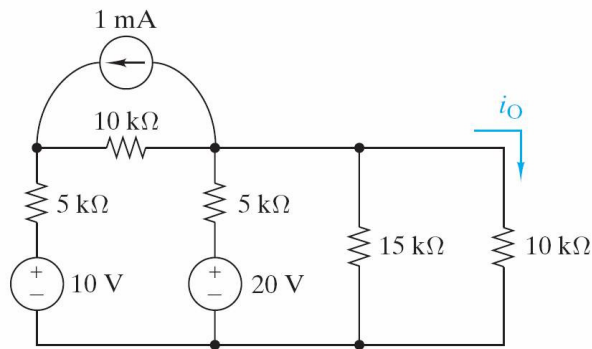
Home work Set # 4

Print Your Name

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Problem#1: Problem 3-22 textbook
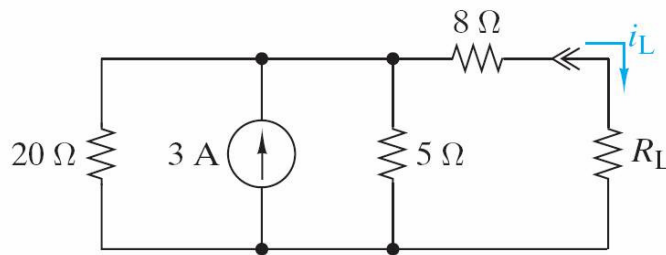Find the proportionality constant $K=i_o/v_s$ for the given circuit.

Problem#2: Problem 3-29 textbook
Use the superposition principle to find the output current i_O.

Problem#3: Problem 3-38 textbook
Find the Norton equivalent circuit seen by R_L. Find the current when $R_L=6\Omega$, 12 Ω, and 60 Ω.

Problem#4: MATLAB Program
The i-v characteristics of an active circuit is *3v+300i=60*. Write a MATLAB program to plot the output voltage versus R_L curve when the load resistance is changing form 500 Ω to 3 kΩ.
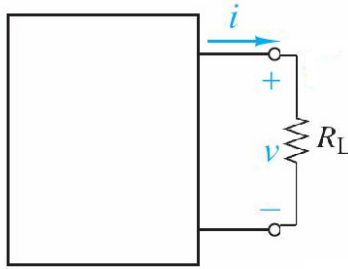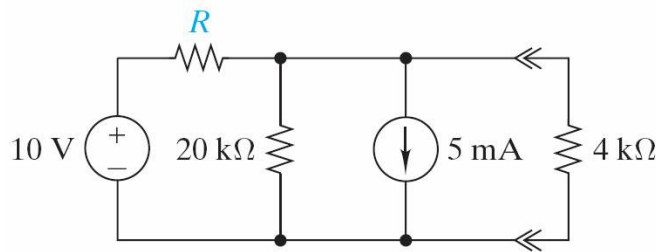
Problem#5: Problem 3-45 textbook

The Thevenin equivalent parameters of a voltage source are v_T=25 V and R_T=150 Ω. Find the smallest load resistance for which the load voltage exceeds 15 V.

Problem#6: Problem 3-50 textbook (MATLAB Problem)

A nonlinear resistor is connected across a two terminal source whose Thevenin equivalent is v_T=10 V and R_T=200 Ω. The i-v characteristics of the resistor is $v=4000i^2$. Plot the i-v characteristics of the source and the resistor with **MATLAB** and graphically determine the voltage across and current through the nonlinear resistor.

Problem#7: Problem 3-56 textbook

Find the value of R in the circuit so that maximum power is delivered to the 4kΩ load. Find the maximum power.

Problem#8: Problem 3-61 textbook

The output current of the voltage source in the Figure must be less than 100mA. Design an interface circuit so that the load voltage is v_2=4 V and the source current is i_1<100 mA.