The Ohio State University
Department of Electrical Engineering

ECE 205

Circuit Analysis

Home work Set # 5

Print Your Name

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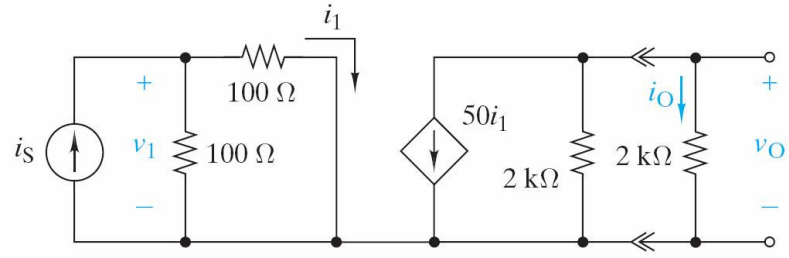
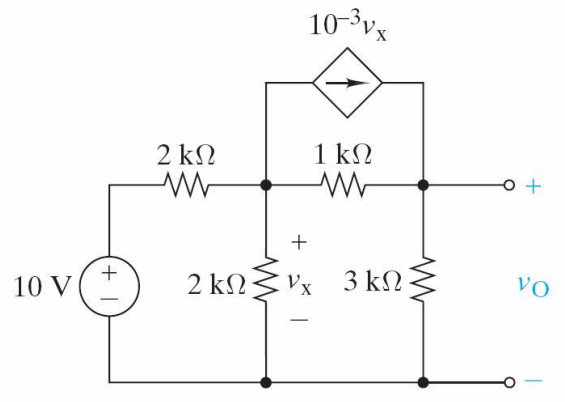
Problem#1: Problem 4-2 textbook

Find the voltage gain vo/v1 and the current gain i_o/i_s for the given circuit. If the input current is i_s=2mA, find the power supplied by the input current source.



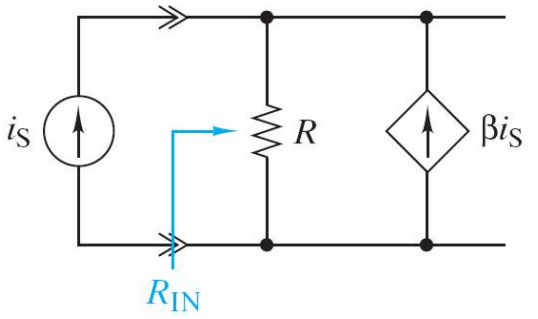
Problem#2: Problem 4-7 textbook

Find the output voltage.



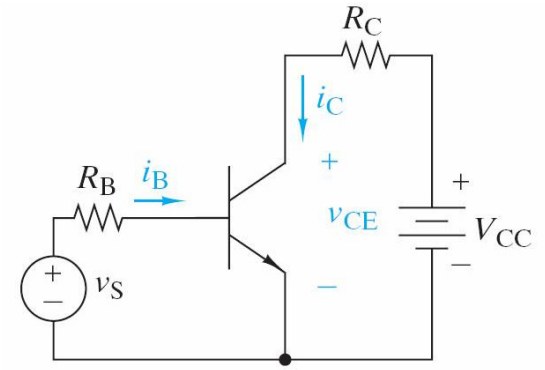
Problem#3: Problem 4-13 textbook

Find the input resistance R_{IN}.



Problem#4: Problem 4-16 textbook

The circuit parameters are R_B=50 k Ω, R_C=3 k Ω, β=100, V_γ=0.7 V, and V_{CC}=15 V. Find the collector current i_C and V_{CE} for v_s=2 V.

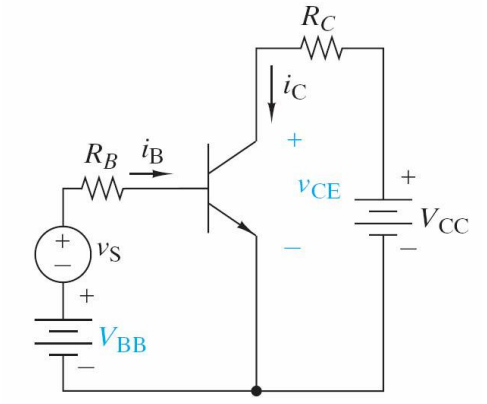


Problem#5: MATLAB Program

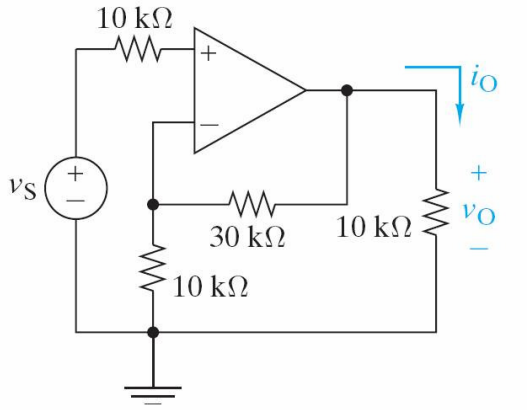
The input to the circuit is a series connection of a dc source and signal source v_s. The parameters of the circuit are R_B=500 k Ω, R_C=5 k Ω, β=100, V_γ=0.7 V, and V_{CC}=15 V.

a) With v_s=0 select the value of V_{BB} so that the circuit is in active mode when v_{CE}= V_{CC}/2.

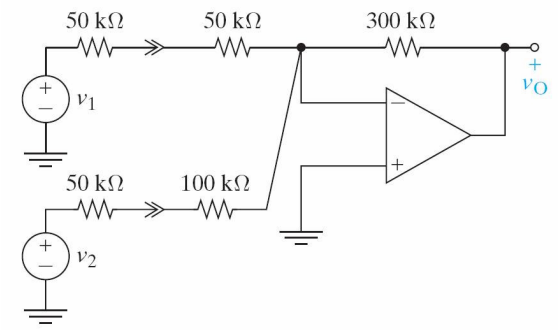
b) Using the same value of V_{BB} plot the characteristics of v_{CE} versus v_s as the signal voltage changes from -10V to +10V.



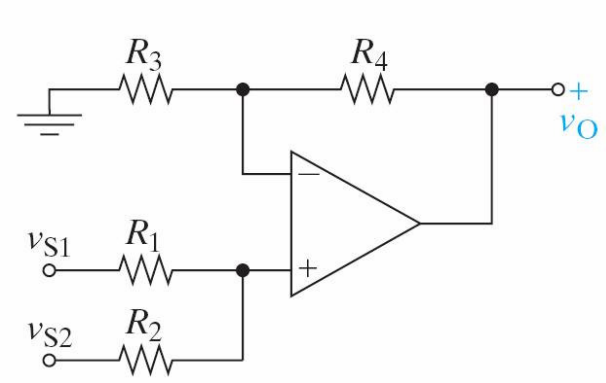
Problem#6: Problem 4-23 textbook
Find v_O in terms of v_s.



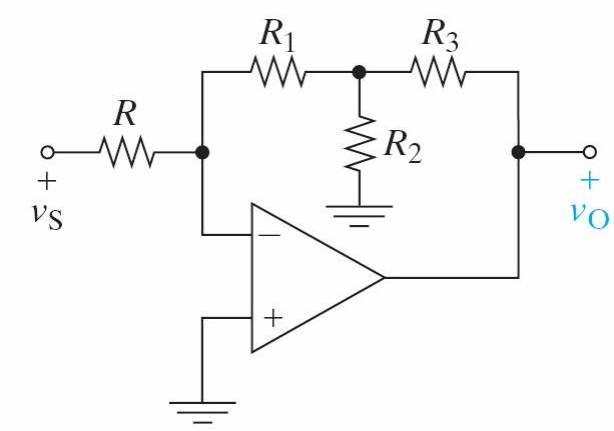
Problem#7: Problem 4-26 textbook
Find v_O in terms of inputs v_1 and v_2.



Problem#8: Problem 4-30 textbook
Find vo in terms of vs1 and vs2.



Problem#9: Problem 4-33 textbook
Using node voltage analysis, find the input- output relationship.



Problem#10: Problem 4-11 textbook
Find an expression for vo/vs.