Quiz for Lesson 20 and 21

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Electronic Circuits 1
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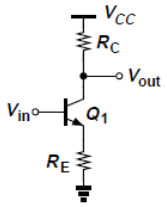
Name: _____ Student ID: _____

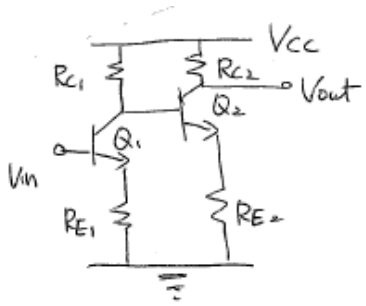
Prob. 1

Determine the input resistance of the following common-emitter amplifier with emitter degeneration. Assume the transistor is in the forward active region and there is no Early effect.



Prob. 2

Determine the small-signal voltage gain for the following cascaded amplifier. Assume the transistors are in the forward active region and the Early effect can be ignored.

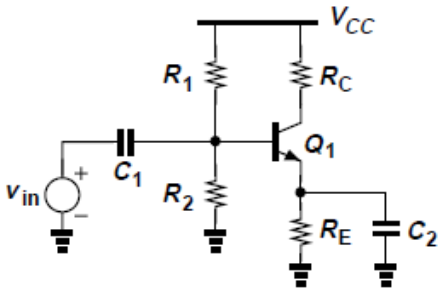


Prob. 3

Determine the output resistance of the common-emitter amplifier with emitter degeneration shown in Prob. 1. Assume the transistor is in the forward active region. Include r_0 due to the Early effect.

Prob. 4

Determine the value of R_E so that the collector bias current (DC value of I_C without any input) is 1mA in the circuit shown below at room temperature. Q_1 has I_s of $1x10^{-16}$A and β = 100, V_{CC}=1.5V, R_1 =6kΩ and R_2=9kΩ. Assume Q_1 is in the forward active region and the base current can be ignored for this problem. Do not consider the the Early effect.



Prob. 5

Explain why the common-emitter with emitter degeneration is less sensitive to the supply voltage fluctuation than the common-emitter is.

Prob. 6

$V_{in}(t)$ is given as $V_o\sin(2\pi ft)$ where f is large enough so that impedances for C_1 and C_2 can be approximated as zero. What is the small-signal output voltage measured between the collector and the ground for the circuit shown in Prob. 4? Use the conditions given in Prob. 4 along with R_C = 500Ω.