Quiz for Lesson 22

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Electronic Circuits 1
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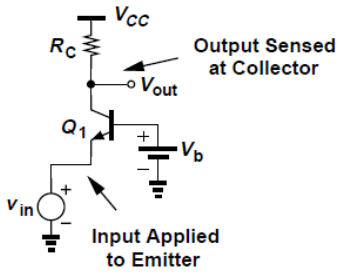
Name: _____ Student ID: _____

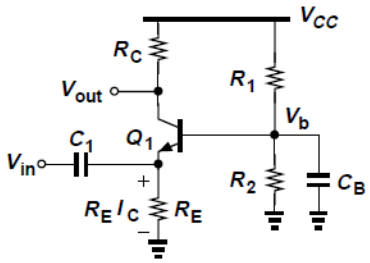
Prob. 1

Determine the small-signal voltage gain (A_v), input resistance (R_{in}) and output resistance (R_{out}) of the common-base amplifier shown below. Assume the transistor is in the forward active region. Do not consider the Early effect.



Prob. 2

Consider a common-emitter amplifier with a resistive bias shown below. Q_1 has I_s of $1x10^{-16}$A and β = 100, and V_T = 25mV, V_{CC}=1.5V, R_1 =4kΩ and R_2=11kΩ. Determine the numerical value for R_E so that the amplifier has the input resistance of 25Ω. Make reasonable approximations and do not consider the Early effect. Assume capacitors are open for bias and short for small-signal analysis.



Prob. 3

For the circuit given in Prob. 2, determine the largest small-signal voltage gain possible. Assume Q_1 becomes saturated when its collector voltage is the same as its base voltage.