Quiz for Lesson 23 and 24

Nov. 10, 2015
Electronic Circuits 1
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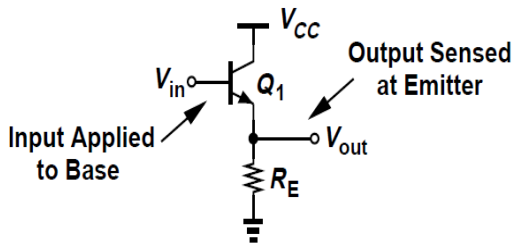
Name: _____ Student ID: _____

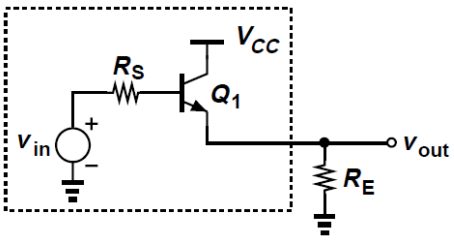
Prob. 1

Determine the expressions for small-signal voltage gain (A_v), input resistance (R_{in}) and output resistance (R_{out}) for the emitter-follower circuit shown below. Assume the transistor is in the forward active region and the Early voltage is infinitely large.



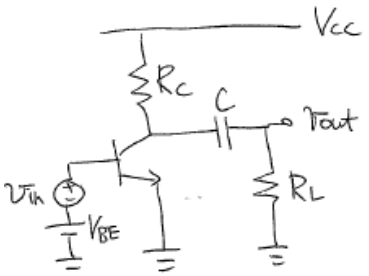
Prob. 2

Determine the expressions for small-signal voltage gain (A_v, V_{out}/V_{in}), input resistance (R_{in}, Measured between +terminal of V_{in} and ground) and output resistance (R_{out}) for the emitter-follower with source resistance shown below. Assume the transistor is in the forward active region and the Early voltage is infinitely large.



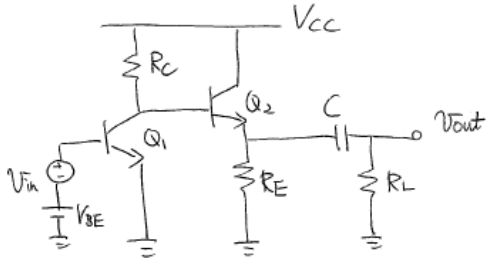
Prob. 3

Determine the numerical value for the small-signal voltage gain of the common-emitter circuit shown below with the following conditions: β=100, I_s=1x10^{-16}A, V_{BE} = 0.75V, V_T= 25mV, V_{CC} = 2V, R_C=1KΩ, R_L= 10Ω. Ignore the Early effect. Assume the capacitor value is carefully selected so that it is open for bias and short for small-signals. Make reasonable approximations.



Prob. 4

Determine the numerical value for R_E in the following circuit composed of a common-emitter followed by an emitter follower. V_{BE} = 0.75V, V_T= 25mV, V_{CC} = 2V, R_C=1KΩ, R_L= 10Ω. Both transistors have β=100, I_s=1x10^{-16}A and Q_2 has the same collector current as Q_1. Ignore the Early effect. Make reasonable approximations.



Prob. 5

Determine the numerical value for the small-signal voltage gain for the circuit shown in Prob. 4.Make reasonable approximations.