CMPE 314 Midterm Exam 2

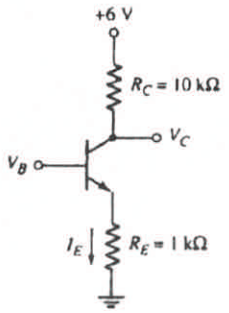
(April 15, 2010)

Problem 1. (15 points)

Describe the active forward mode operation of a p-n-p bipolar transistor. (Structure, voltage biasing conditions and connections, type of charge carries, control action, current relations, etc.)

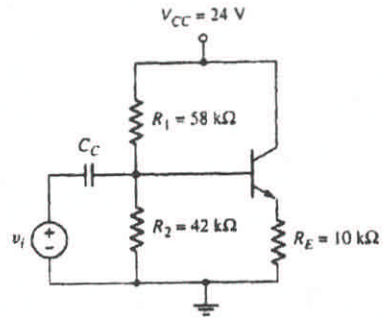
Problem 2. (20 points)

The transistor in the circuit has β=200. Determine V_C and the power dissipated in the transistor for V_B = 2 V. (Be careful about the operation mode of the transistor.)



Problem 3. (25 points)

The transistor in the circuit has β=125. Find I_{CQ} and V_{CEQ}. Sketch the load line and plot the Q-point.



Problem 4. (40 points)

(a) Write down sufficient equations and steps that lead to solving I_{BQ}, I_{CQ}, and V_{CEQ} of the circuit.

(b) Assume V_A= ∞. Draw the AC equivalent circuit including the hybrid-π model of transistor. What is the slope of the AC load line? Comment the type of the amplifier configuration and the main features (small-signal voltage and current gain, input and output resistance.)