

Name: _____ (please print)

Signature: _____

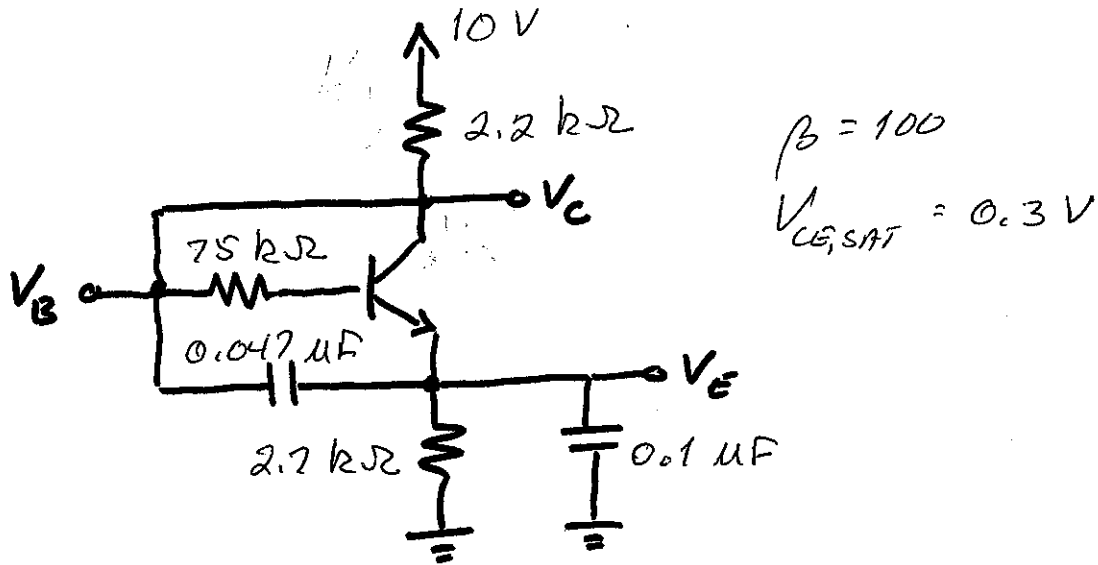
ECE 3455
Quiz #5
April 16, 2007

Quiz duration: 25 minutes

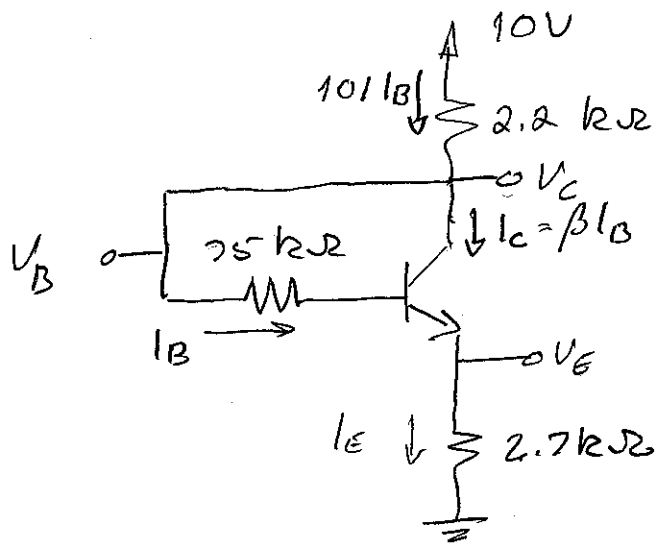
1. You may have one 8 ½ x 11 in. “crib” sheet, written on both sides, during the quiz. You may have any calculator you choose, but no computers. No other notes or materials will be allowed.
2. Show all work necessary to complete the problem on these pages. A solution without the work shown will receive no credit.
3. Show units in intermediate and final results, and in figures.
4. If your work is sloppy or difficult to follow, points will be subtracted.

_____ /20

The BJT in the circuit below has $\beta = 100$ and $V_{CE,SAT} = 0.3$ V. Find the DC terminal voltages (V_C , V_E , V_B).



At DC, capacitors are open circuit. So we have



KVL:

$$-10 + 2200(101)I_B + 75000I_B + 0.7 + 2700(101)I_B = 0$$

$$I_B = \frac{9.3}{101(2200) + 75000 + 101(2700)}$$

$$= 16.32 \mu\text{A}$$

Room for Extra Work

$$\therefore V_E = 101 I_B \cdot 2200 = 4.45 \text{ V}$$

$$\begin{aligned} V_B &= 75000 I_B + 0.7 + V_E \\ &= 6.37 \text{ V. } (= V_C) \end{aligned}$$

$$\begin{aligned} V_C &= 10 - 101 I_B \cdot 2200 \\ &= 6.37 \text{ V} \end{aligned}$$

Check: $I_B > 0$ ✓

$$V_{CE} = 6.37 - 4.45 = 1.92 \text{ V} > V_{CE, \text{SAT}} \quad \checkmark$$