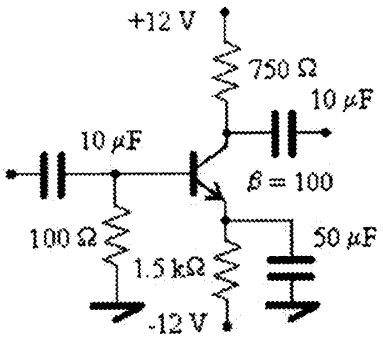
Baskent University, Faculty of Engineering
BME 222-02 – Electronics (Spring Semester 2004/2005)
Quiz 2 – April 29, 2005

Student Name_____

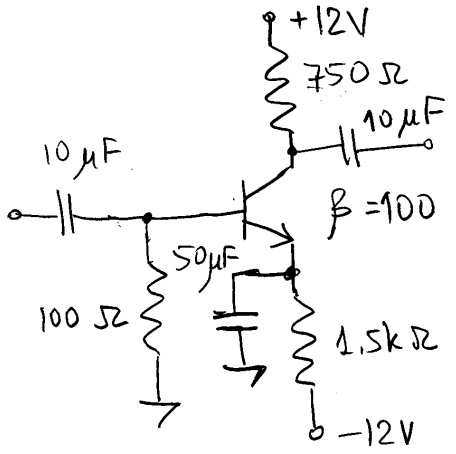
Faculty No: _____



For the emitter-stabilized bias circuit determine: I_B, I_{CQ}, V_{CEQ}, V_B, V_C, V_{BC}.

6 points.

Good Luck



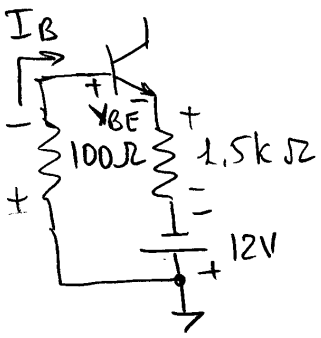
For the emitter-stabilized bias circuit determine:

$I_B, V_B, I_{CQ}, V_{CEQ}, V_C, V_{BC}$

(6 points)

Solution:

1). Input section



$$I_B R_B + V_{BE} + (\beta+1) I_B R_E - 12 = 0$$

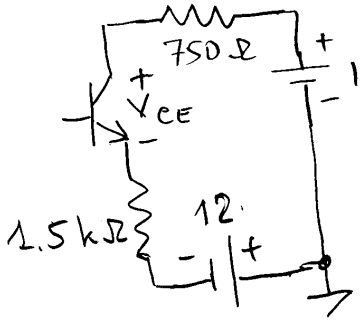
$$I_B = \frac{12 - V_{BE}}{R_B + (\beta+1) R_E} = \frac{12 - 0.7}{100 + 101 \cdot 1.5 \cdot 10^3} =$$

$$= \frac{11.3}{100 + 151.5 \cdot 10^3} = 74.5\ \mu A$$

2). $V_B = -I_B R_B = -74.5\,10^{-6} \cdot 100 = -7.45\ mV$

3). $I_{CQ} = \beta I_B = 100 \cdot 74.5 \cdot 10^{-6} = 7.45\ mA$

4). Output section



$$-R_E I_C - V_{CEQ} - I_C R_C + 12 + 12 = 0$$

$$V_{CEQ} = 24 - I_C (R_C + R_E) =$$

$$= 24 - 7.45 \cdot 10^{-3} (750 + 1.5 \cdot 10^3) =$$

$$= 24 - 16.76 = 7.24\ V$$

5). $V_C = 12 - I_C R_C = 12 - 7.45 \cdot 10^{-3} \cdot 750 = 12 - 5.59 = 6.41\ V$

6). $V_{BC} = V_B - V_C = -7.45 \cdot 10^{-3} - 6.41 = -6.41\ V$