

In the Name of God

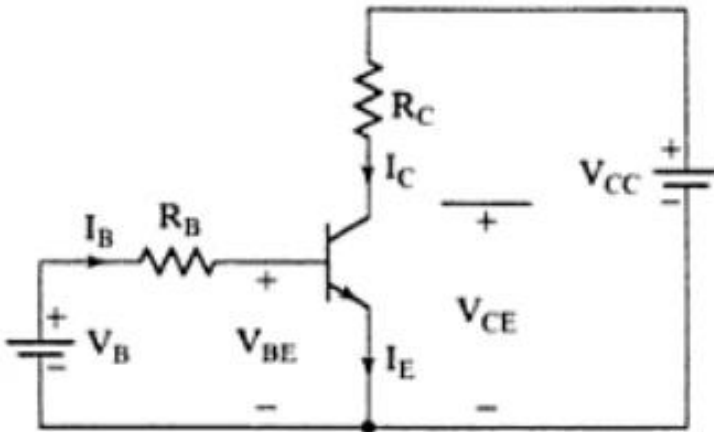
Quiz 1

Name:

Course: Power Electronics

Student Number:

The beta (β) of bipolar transistor in figure below varies from 10 to 60. The load resistance is $R_C = 5\Omega$. The dc supply voltage is $V_{CC} = 100V$ and the input voltage to the base circuit is $V_B = 8V$. If $V_{CE(sat)} = 2.5V$ and $V_{BE(sat)} = 1.75V$, find the value of R_B that will result in saturation with an overdrive 20.



$$I_{CS} = \frac{V_{CC} - V_{CE(sat)}}{R_C} = \frac{100 - 2.5}{5} = 19.5A, I_{BS} = \frac{I_{CS}}{\beta_{min}} = \frac{19.5}{10} = 1.95A$$

$$I_B = I_{BS} \times ODF = 1.95 \times 20 = 39A, R_B = \frac{V_B - V_{BE(sat)}}{I_B} = \frac{8 - 1.75}{39} = 0.16\Omega$$