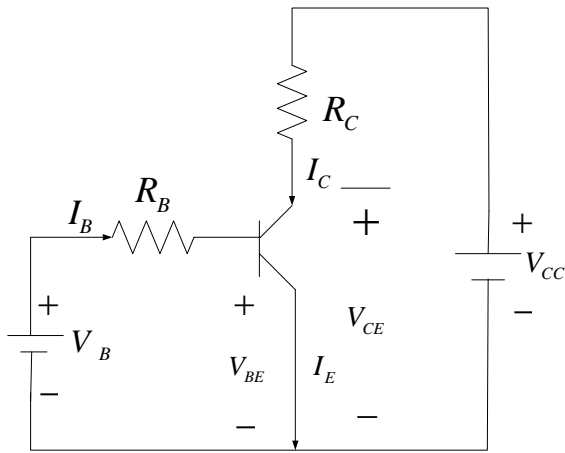


DGD7-Power Transistors (Ref to Muhammard <Power Electronics> Third Edition Chapter 4)

Q1.(Example 4.1 Finding the Saturation Parameters of a BJT) The bipolar transistor in below figure is specified to have $\beta_F = 8$. The load resistance is $R_c = 11\Omega$. The dc supply voltage is $V_{CC} = 200V$ and the input voltage to the base circuit is $V_B = 10V$. If $V_{CE(sat)} = 1V$ and $V_{BE(sat)} = 1.5V$, find (a) the value of R_B that results in saturation with an ODF(overdrive factor, $ODF = \frac{I_B}{I_{BS}}$) of 5, (b) the β_{forced} ($\beta_{forced} = \frac{I_{CS}}{I_B}$), and (c) the power loss P_T in the transistor($P_T = V_{BE}I_B + V_{CE}I_C$).



(Solution: $I_{CS} = \frac{V_{CC} - V_{CE(sat)}}{R_C}$, $I_{BS} = \frac{I_{CS}}{\beta_F}$,(a)

$R_B = 0.7514\Omega$,(b) $\beta_{forced} = 1.6$,(c) $P_T = 35.07W$)