# General Sir John Kotelawala Defense University

**Basic Electronics**

**Tutorial 3 – Transistors**

Question 1

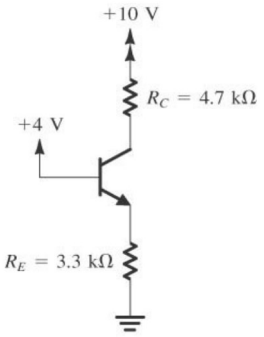


Figure 1

Determine $I_B$, $I_C$, and $V_C$ for $\alpha = 0.99$. Assume the transistor to be of silicon.

Question 2

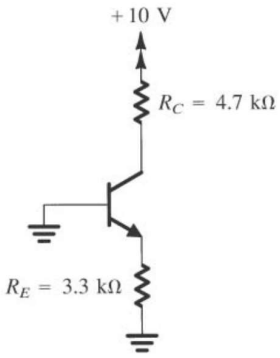


Figure 2

Determine $I_B$, $I_C$, $V_E$ and $V_C$.

Question 3

Determine $I_{C(sat)}$ for the transistor in Figure 3. What is the value of $I_B$ necessary to produce saturation? What minimum value of $V_{IN}$ is necessary for saturation? ($\beta = 150$)

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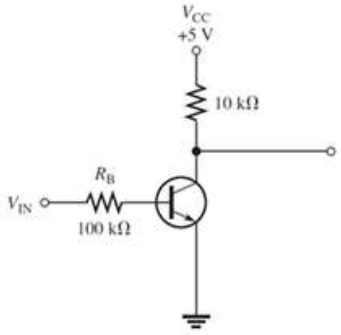


Figure 3

Question 4

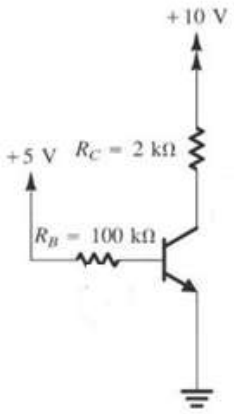


Figure 4

Determine $I_B$, $I_C$, $I_E$ and $V_C$ for $\alpha = 100$. Assume the transistor to be of silicon.

Question 5

Complete the design of the fixed-based transistor circuit shown by determining $R_C$ and $R_B$ for a Q-point of $I_C = 6mA$ and $V_{CE} = 4V$. The transistor forward current gain is $\beta = 200$ with a $V_{BE} = 0.7V$.

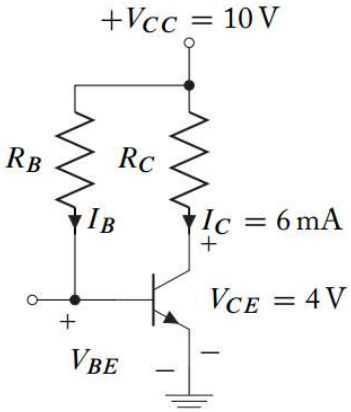


Figure 5

Question 6

Find the operating point ($V_{CE}$, $I_B$ and $I_C$) for the emitter biased circuit with two power supplies shown in Figure 6. Let $V_{BE}$ = 0.84v, β = 200.

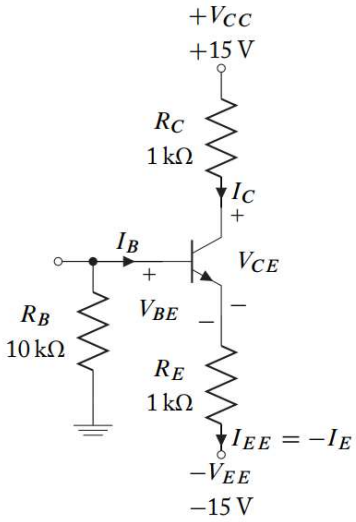


Figure 6