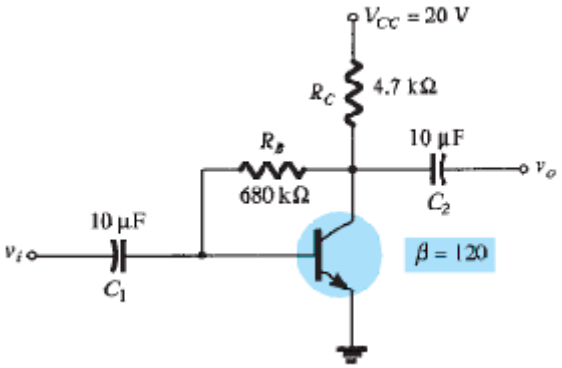
EXAMPLE 4.18 For the network of Fig. 4.53 :

a. Determine I_{CQ} and U_{CEQ}.

b. Find U_B, U_C, U_E, and U_{BC}.



$R_B := 680k\Omega$ $R_C := 4.7k\Omega$ $U_{CC} := 20V$ $\beta := 120$ $U_{BE} := 0.7V$

$$I_B := \frac{U_{CC} - U_{BE}}{R_B + \beta \cdot R_C} \text{ explicit, ALL } \rightarrow \frac{20 \cdot V - 0.7 \cdot V}{680 \cdot k\Omega + 120 \cdot 4.7 \cdot k\Omega} = 15.51\,\mu A$$

$I_B := 15.51\ \mu A$

$I_{CQ} := \beta \cdot I_B$ explicit, ALL $\rightarrow 120 \cdot 15.51 \cdot \mu A = 1.861\,mA$

$I_{CQ} := 1.861\ mA$

$U_{CEQ} := U_{CC} - I_{CQ} \cdot R_C$ explicit, ALL $\rightarrow 20 \cdot V - 1.861 \cdot mA \cdot 4.7 \cdot k\Omega = 11.25\,V$

$U_B = U_{BE}$

$U_B := 0.7V$

$U_C = U_{CE}$

$U_C := 11.25V$

$U_E := 0$

$U_{BC} := U_B - U_C$ explicit, ALL $\rightarrow 0.7 \cdot V - 11.25 \cdot V = -10.55\,V$