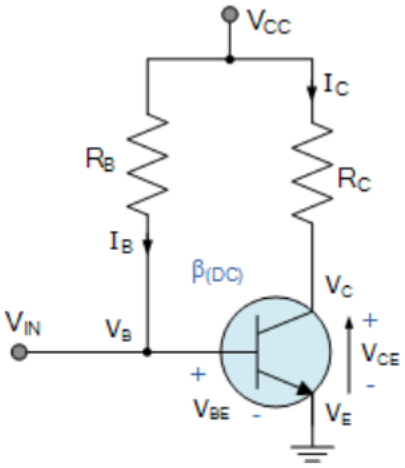
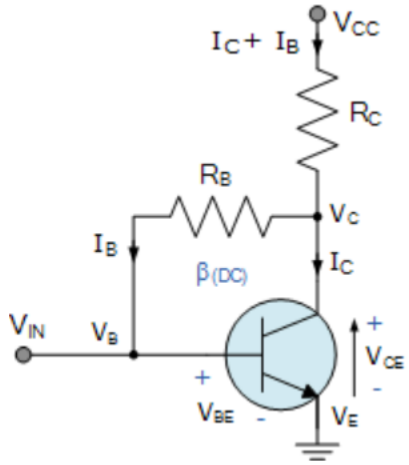
Fixed Base Biasing a Transistor



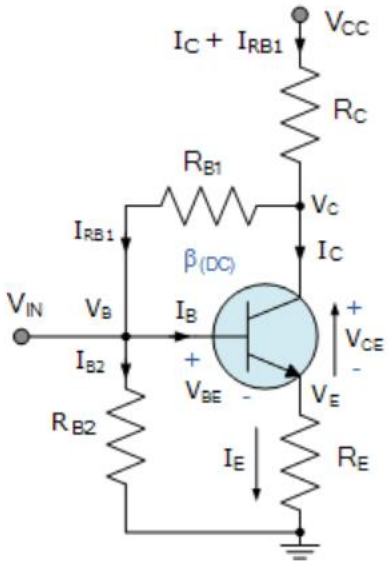
$V_C = V_{CC} - (I_C R_C)$
$V_{CE} = V_C - V_E$
$V_E = 0v$
$V_B = V_{BE}$
$I_B = \frac{V_{CC} - V_{BE}}{R_B}$
$I_C = \beta_{(DC)} I_B$
$I_E = (I_C + I_B) \cong I_C$

Collector Feedback Biasing



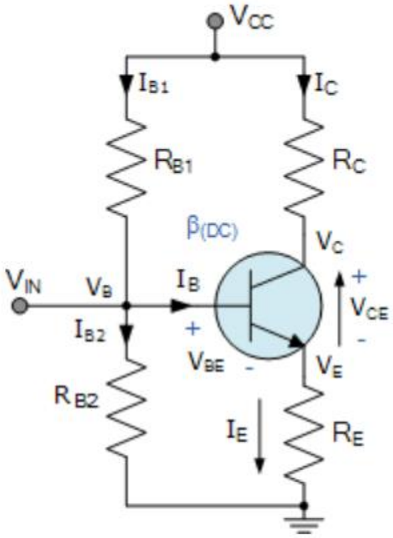
$V_C = V_{CC} - R_C(I_C + I_B)$
$V_E = 0v$
$V_B = V_{BE}$
$I_B = \frac{V_C - V_B}{R_B}$
$I_C = \beta_{(DC)} I_B$
$I_E = (I_C + I_B) \cong I_C$

Emitter Feedback Configuration



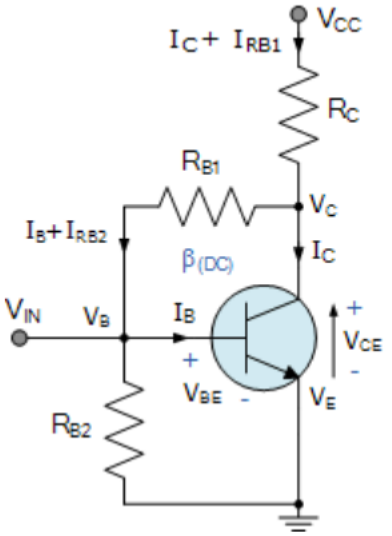
$$V_C = V_{CC} - R_C(I_C + I_{B1})$$
$$V_E = I_E R_E = V_B - V_{BE}$$
$$V_{CE} = V_C - V_E$$
$$V_B = V_{BE} + V_E$$
$$I_{RB2} = \frac{V_B}{R_{B2}}$$
$$I_{RB1} = I_B + I_{RB2} = \frac{V_C - V_B}{R_{B1}}$$
$$I_C = \beta_{(DC)} I_B$$
$$I_E = (I_C + I_B) \cong I_C$$

Voltage Divider Transistor Biasing



$$V_C = V_{CC} - R_C I_C = (V_E + V_{CE})$$
$$V_E = I_E R_E = V_B - V_{BE}$$
$$V_{CE} = V_C - V_E = V_{CC} - (I_C R_C + I_E R_E)$$
$$V_B = V_{BE} + V_E = V_{RB2} = \left(\frac{R_{B2}}{R_{B1} + R_{B2}}\right) V_{CC}$$
$$I_{B2} = \frac{V_B}{R_{B2}}$$
$$I_{B1} = I_B + I_{B2} = \frac{V_{CC} - V_B}{R_{B1}}$$
$$R_B = \frac{R_{B1} \times R_{B2}}{R_{B1} + R_{B2}} \qquad I_B = \frac{V_B - V_{BE}}{R_B + (1+\beta) R_E}$$
$$I_C = \beta_{(DC)} I_B$$
$$I_E = I_C + I_B = \frac{V_E}{R_E}$$

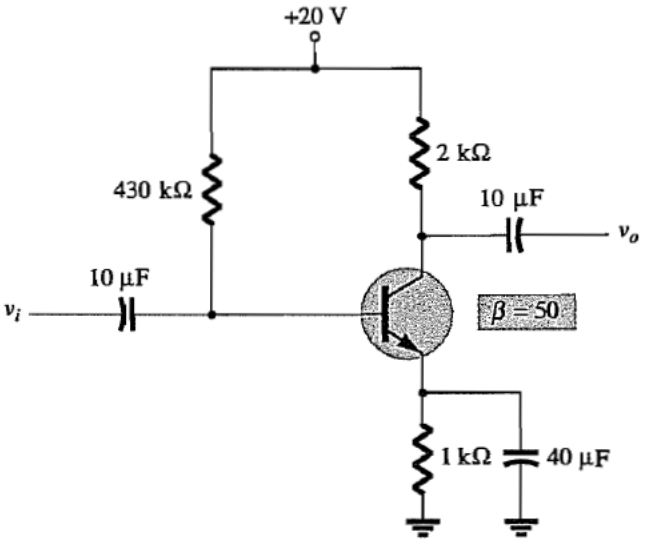
Dual Feedback Transistor Biasing



$V_C = V_{CC} - R_C(I_C + I_{B1})$
$V_E = 0V$
$V_B = V_{BE}$
$I_{RB2} = \frac{V_B}{R_{B2}}$
$I_{RB1} = I_B + I_{RB2} = \frac{V_C - V_B}{R_{B1}}$
$I_C = \beta_{(DC)} I_B$
$I_E = (I_C + I_B) \cong I_C$

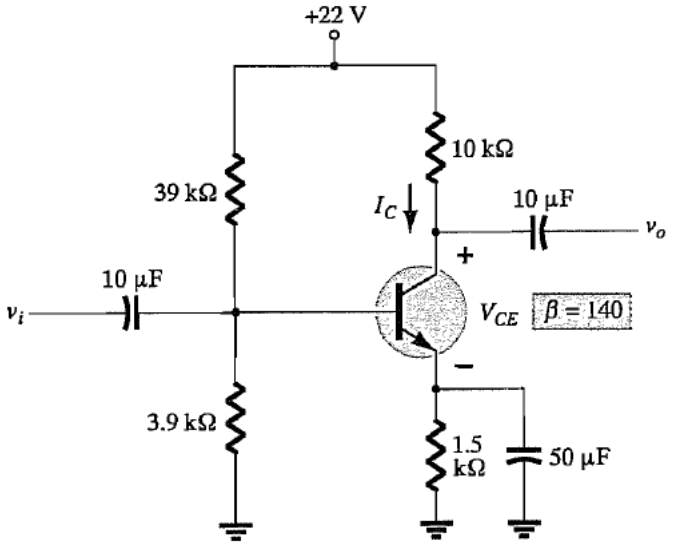
For the emitter bias network of Fig. 1 determine:

a. I_B.
b. I_C.
c. V_{CE}.
d. V_C.
e. V_E.
f. V_B.
g. V_{BC}.



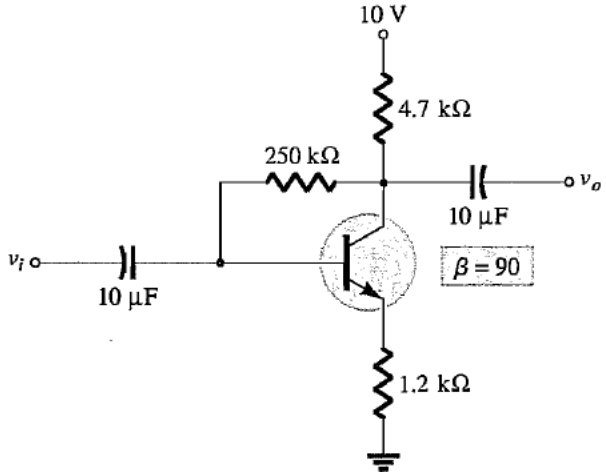
1.

2. Determine the dc bias voltage V_{CE} and the current I_C for the voltage-divider configuration of Fig. 2

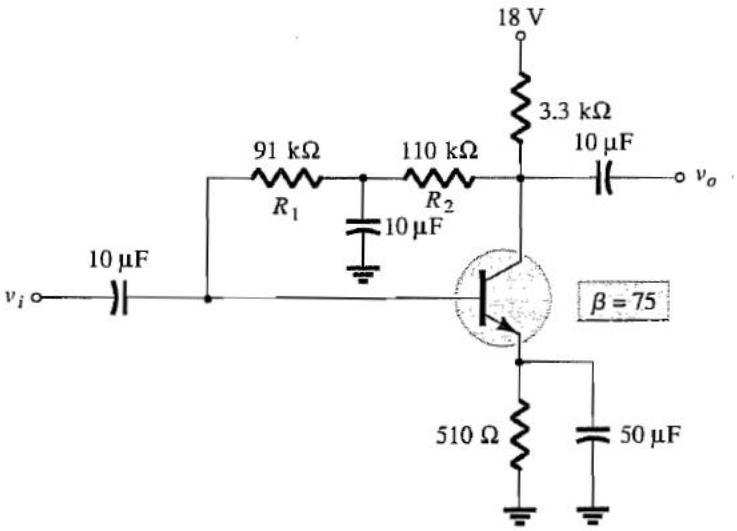


Determine the quiescent levels of I_{C_Q} and V_{CE_Q} for the network of Fig.

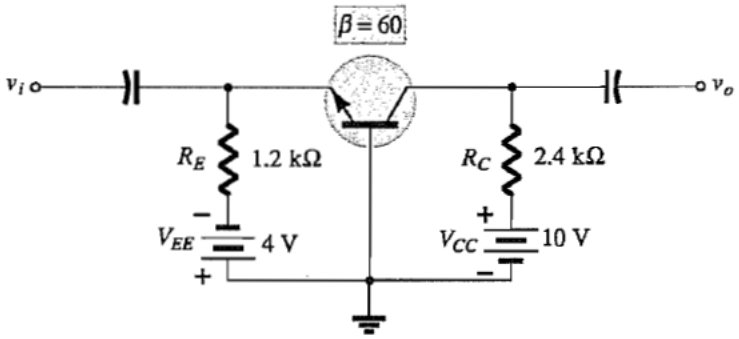
3.



Determine the dc level of I_B and V_C for the network of Fig.



4. Determine the voltage V_{CB} and the current I_B for the common-base configuration of Fig.



5.