Kathmandu University
Department of Electrical and Electronics Engineering
ENGG 211 Electronics Engineering-I
#Assignment-2 (BJT)

1. If the emitter current of a transistor is 8mA and I_B is 1/100 of I_C, determine the levels of I_C and I_B.
2. a. Given α_{dc} of 0.998, determine the I_C if I_E = 4 mA.
   b. Determine the α_{dc} if I_E = 2.8 mA and I_B = 20μA.
3. With explanation, draw emitter current (I_E) versus base to emitter potential difference (V_{BE}) and collector current (I_C) versus collector to emitter potential difference (V_{CE}) for a NPN type Bipolar Junction Transistor operating in the active region.
4. Find the collector current and the emitter potential in the circuit shown in figure 1, Assume base emitter drop as 0.7 V and β =100.

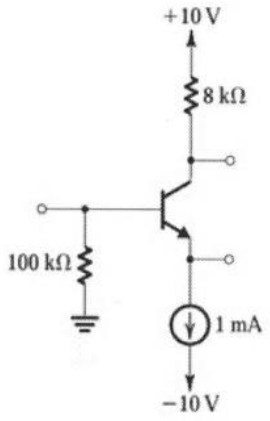

Figure *1*

5. Show that the transistor of figure 2 is working in the saturation region.

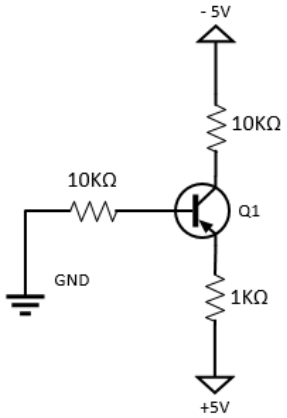

Figure 2

6. For the fixed-bias configuration of figure 3, determine:
   a. V_{CC} b. I_{CQ} c. β d. R_B

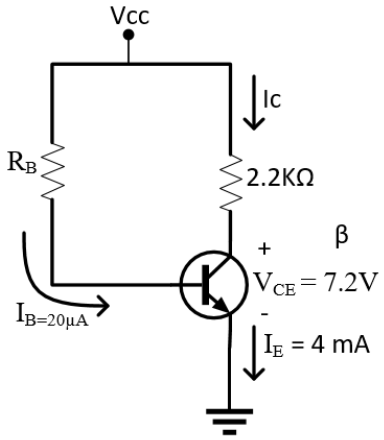

Figure 3

7. Given the information provided in figure 4, determine:
   a. R_C b. R_E c. R_B d. V_{CE} e. V_B

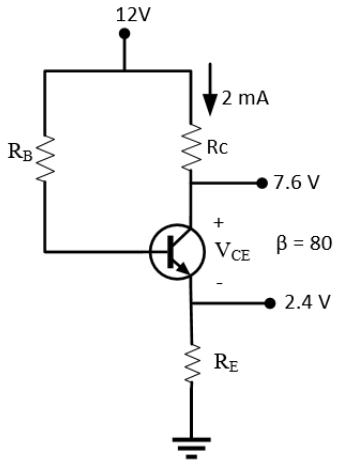

Figure 4

8. a. Determine I_C and V_{CE} for the network of figure 5.
   b. Change β to 135 and determine the new value of I_C and V_{CE} for the network of figure 5.
   c. Determine the magnitude of the percent change in I_C and V_{CE} using the following equations:

$$\%\Delta I_C = \left| \frac{I_{C(\text{part b})} - I_{C(\text{part a})}}{I_{C(\text{part a})}} \right| \times 100\%, \qquad \%\Delta V_{CE} = \left| \frac{V_{CE(\text{part b})} - V_{CE(\text{part a})}}{V_{CE(\text{part a})}} \right| \times 100\%$$

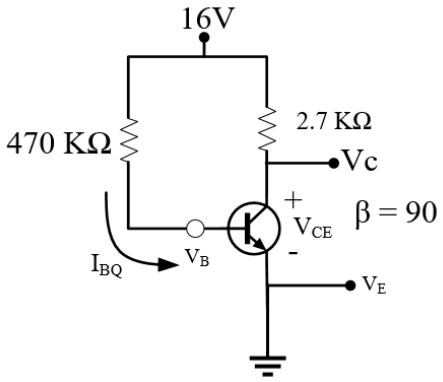

Figure 5

9. Given the information appearing in figure 6. Determine:
   a. I_C b. V_E c. V_{CC} d. V_{CE} e. V_B f. R_1

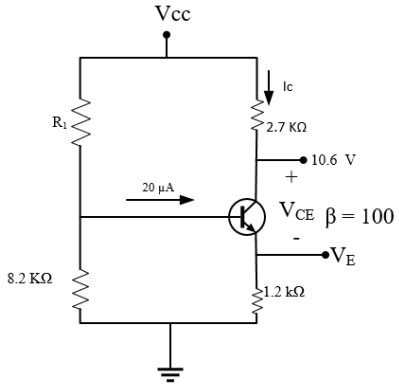

Figure 6

10. For the voltage feedback network of figure 7. Determine :
    a. I_C b. V_C c. V_E d. V_{CE}

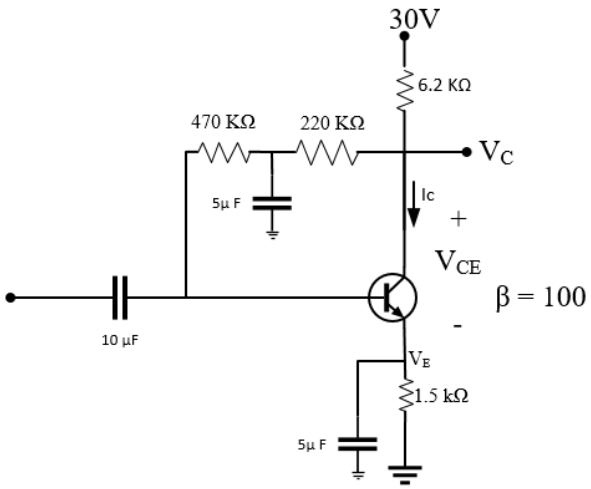

Figure 7

11. Given $V_B = 4V$ for the network of figure 8. Determine:

a. V_E b. I_C c. V_C d. V_{CE} e. I_B

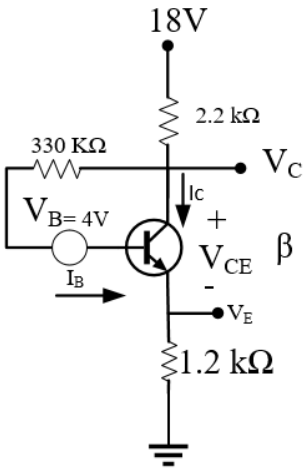

Figure 8

12. For the network of figure 9. Determine:

a. I_B b. I_C c. V_C d. V_{CE}

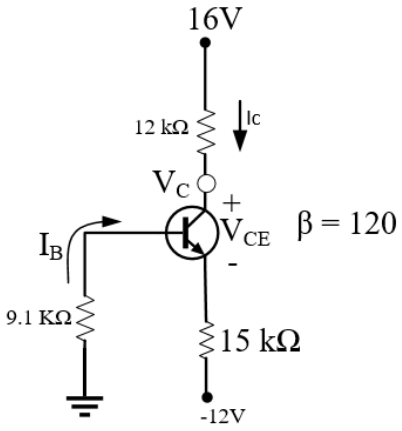

Figure 9