Thapar Institute of Engineering & Technology, Patiala

Department of Electronics and Communication Engineering

Course Code: UEC-301; **Course Name:** Analog Electronic Circuits

B.E. (ECE/ENC) (IV-Sem),

Tutorial Sheet No. - 4

[1] For the fixed-bias configuration of Fig. 1, determine

a. *IBQ*.
b. *ICQ*.
c. *VCEQ*.
d. V_C .
e. V_B .
f. V_E .

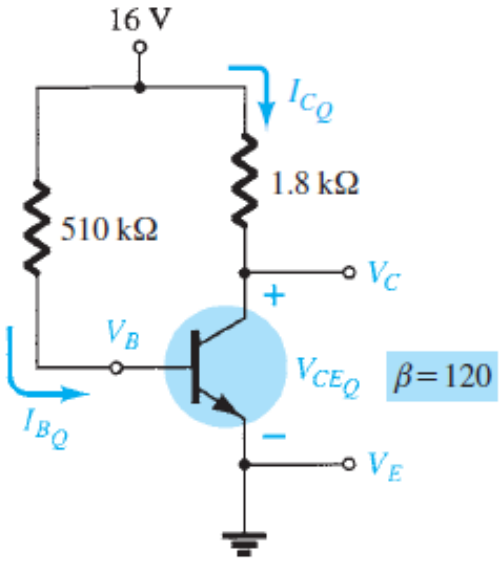
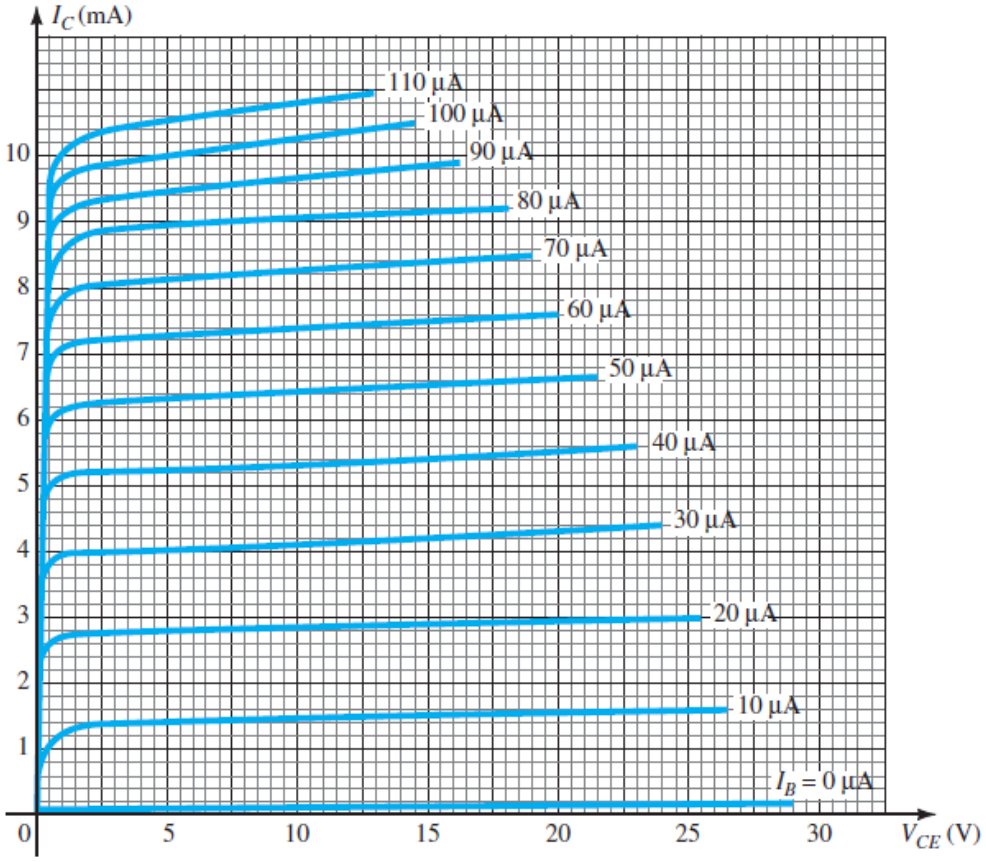


Fig. 1

[2]	Given the BJT transistor characteristics of Fig 2 : **a.** Draw a load line on the characteristics determined by $E = 21$ V and $R_C = 3\,\text{k}\Omega$ for a fixed-bias configuration. **b.** Choose an operating point midway between cutoff and saturation. Determine the value of R_B to establish the resulting operating point. **c.** What are the resulting values of I_{C_Q} and V_{CE_Q}? **d.** What is the value of β at the operating point? **e.** What is the value of α defined by the operating point? **f.** What is the saturation current ($I_{C_{sat}}$) for the design? **g.** Sketch the resulting fixed-bias configuration. **h.** What is the dc power dissipated by the device at the operating point? **i.** What is the power supplied by V_{CC}? **j.** Determine the power dissipated by the resistive elements by taking the difference between the results of parts (h) and (i).  Fig. 2
[3]	If the base resistor of Fig. 1 is increased to 910 kohm, find the new *Q* -point and resulting values of *ICQ* and *VCEQ*.
[4]	Given the information provided in Fig. 3 , determine: **a.** R_C . **b.** R_E .

c. R_B .
d. V_{CE} .
e. V_B .

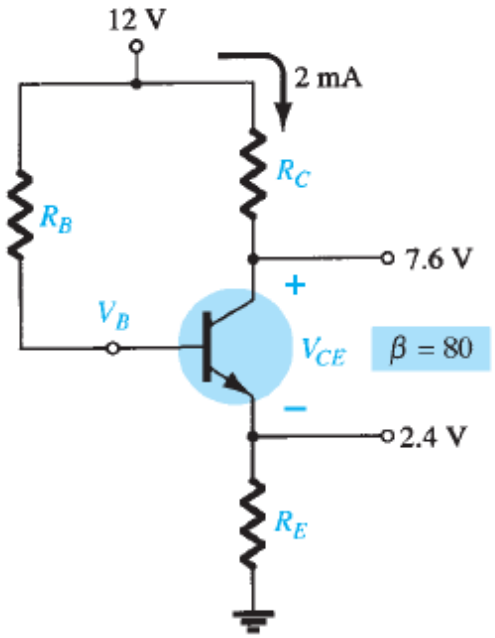


Fig. 3