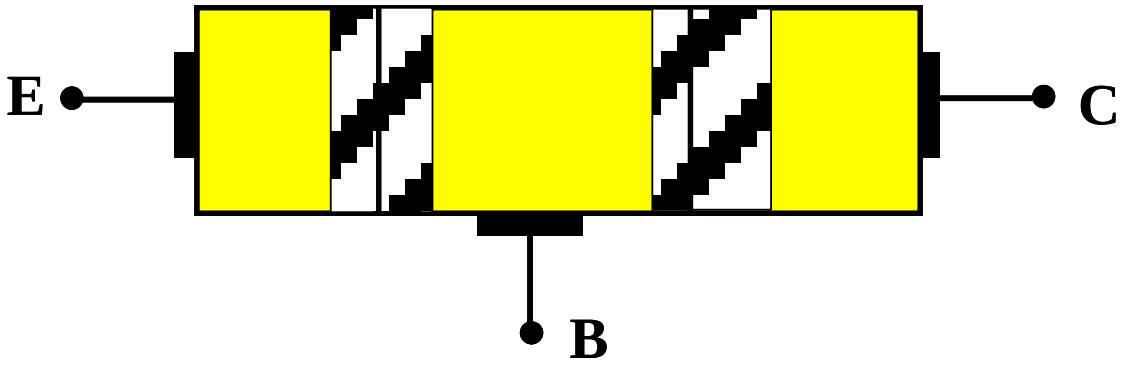
BJT Lab: Theoretical Exercises

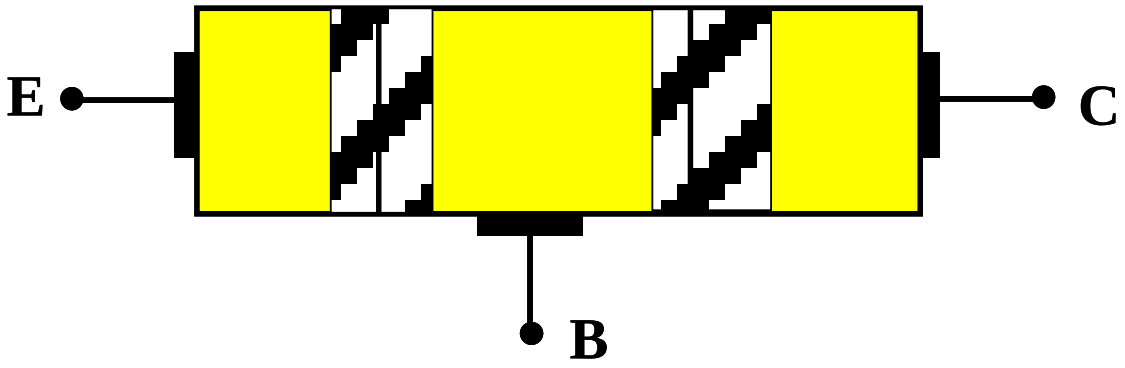
Dragica Vasileska (ASU) and Gerhard Klimeck (Purdue)

1. Show diagrammatically and with analytical expressions (the simple ones) the current components in reverse active mode and in the cut-off mode.

   (a) reverse active mode:



   (b) cut-off mode

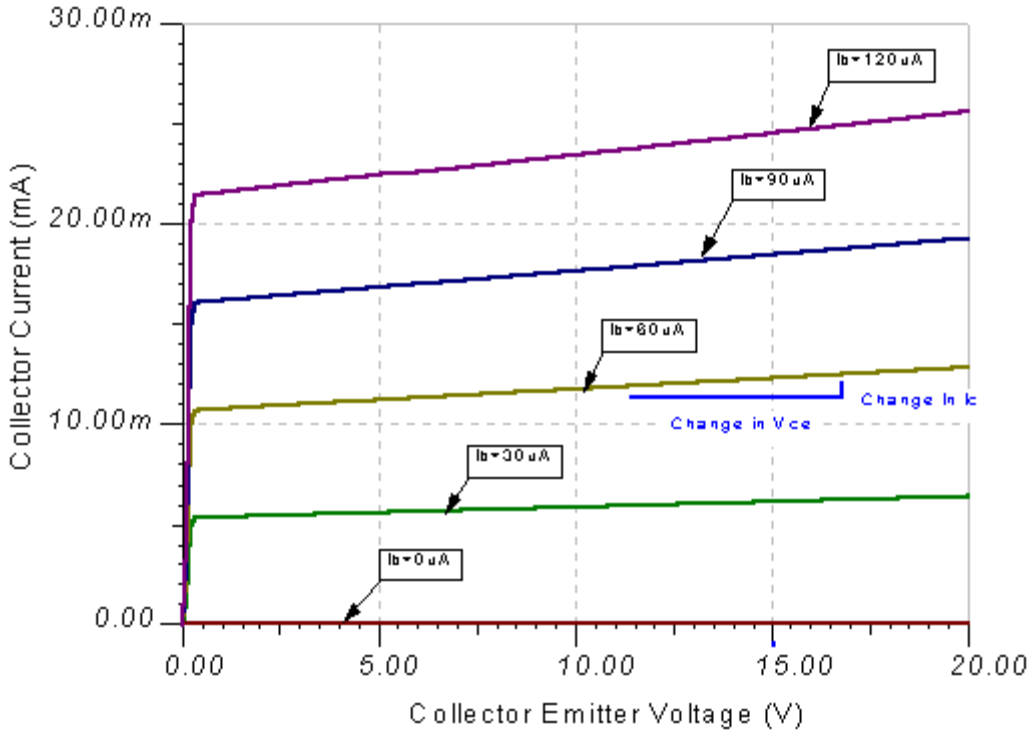


2. On the figure below are given the output characteristics of a BJT in a common-emitter configuration:

   (a) What is the small signal current gain for V_{CE} = 10 V.

   (b) What is the output conductance of this device.

   (c) Estimate the Early voltage of the transistor. What is the reason for the Early effect?


30.00m
20.00m
10.00m
0.00
Collector Current (mA)
Ib=120uA
Ib=90uA
Ib=60uA
Ib=30uA
Ib=0uA
Change in Ic
Change in Vce
0.00
5.00
10.00
15.00
20.00
Collector Emitter Voltage (V)