Consider the common-emitter configuration for an NPN transistor, shown in Fig. 8.5a of DH. Reproduce the transistor characteristics graph of Fig. 8.5b within your homework. Assume $V_{CC} = 10V$ for the configuration and a constant $R_L$.

(a) What is the dependence of $V_{CE}$ on $I_C$ under the conditions of fixed $V_{CC}$ and $R_L$?
(b) The value of $R_L$ is typically set in the design in such a manner that the line representing the dependence of $V_{CE}$ on $I_C$ passes through the upper “knee” in the transistor characteristics such as in Fig. 8.5b. What is the appropriate value of $R_L$ to make the line pass through the “knee”?
(c) The DC current $I_B$ is normally set to make $V_{CE} \geq V_{CC}/2$. From the graph, at what value should the DC current be set?
(d) From the graph, what will be then the AC current gain for the configuration? Recall that $G = \Delta I_C / \Delta I_B$. 