8.1 Find the voltage gain and input resistance of the amplifier in figure 1 assuming that $\beta = 100$.

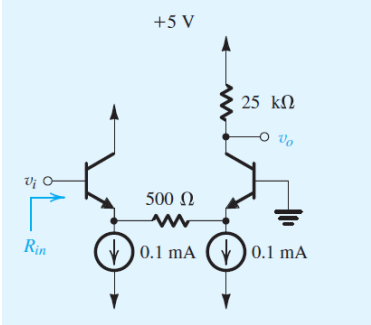

Figure1

8.2 A large fraction of mass-produced differential amplifier modules employing 20-$k\Omega$ collector resistors is found to have an input offset voltage ranging from +2mV to -2mV. By what amount must one collector resistor be adjusted to reduce the input offset to zero? If an adjustment mechanism is devised that raises one collector resistance while correspondingly lowering the other, what resistance change is needed? If a potentiometer connected as shown in figure 2 is used, what value of potentiometer resistance is needed? Assume that the offset is entirely due to the finite tolerance of Rc.

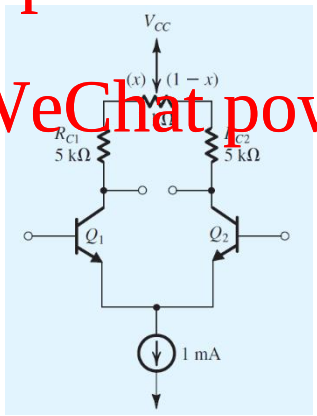

Figure2

8.3 Design the circuit of figure 3 using a basic current mirror o implement the current source I. It is required that the short-circuit transconductance be 5mA/V, and BJT have $\beta = 100$ and $V_A = 100v$. Give the complete circuit with component values and specify the differential input resistance R_{id}, the output resistance R_o, the open-circuit voltage gain A_d, and the CMRR.

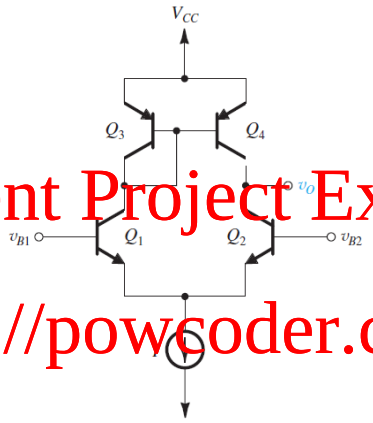

Figure 3