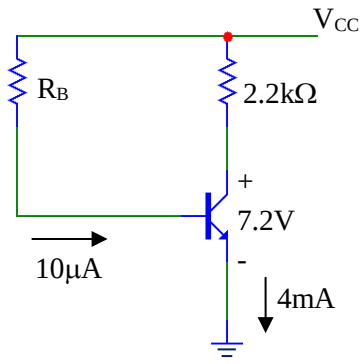
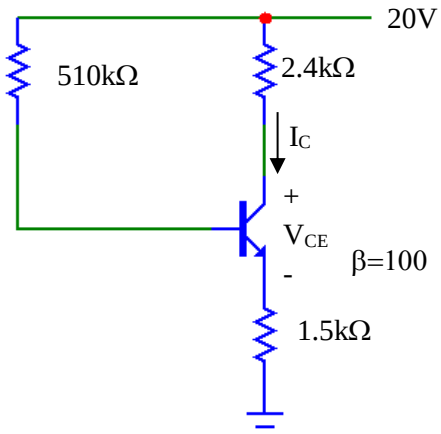
Department of Electrical Engineering, IIT Kanpur ESc 201: Introduction to Electronics

Assignment-7

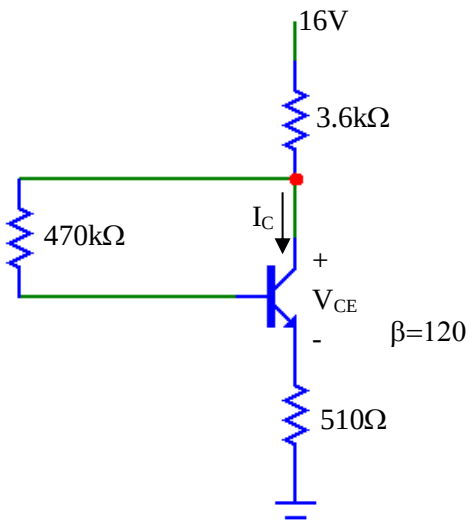
1. Determine V_{cc} and R_B in the following circuit.



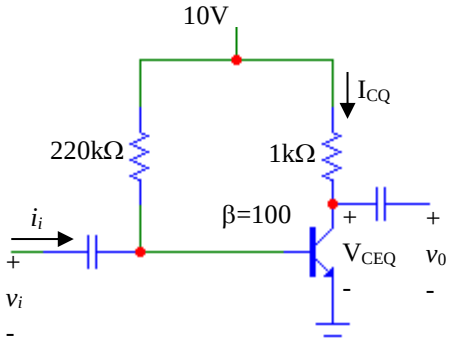
2. Determine I_C and V_{CE} in the following circuit.



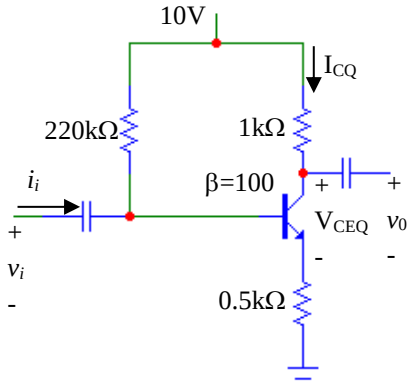
3. Determine I_C and V_{CE} in the following circuit.



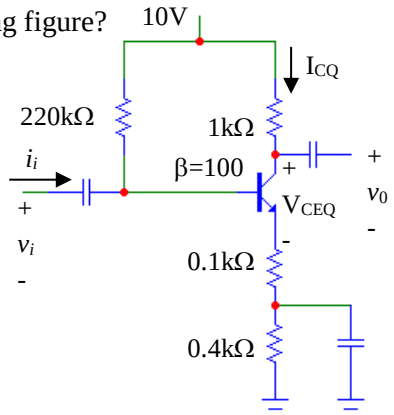
4. For the following common emitter amplifier circuit, calculate V_{CEQ}, I_{CQ}, small signal voltage gain ($A_v = \frac{v_0}{v_i}$), and input impedance ($Z_i = \frac{v_i}{i_i}$).



In order to increase the input impedance of the amplifier, an emitter resistor was introduced into the circuit, as shown in the following figure. Calculate V_{CEQ}, I_{CQ}, A_v, and Z_i.



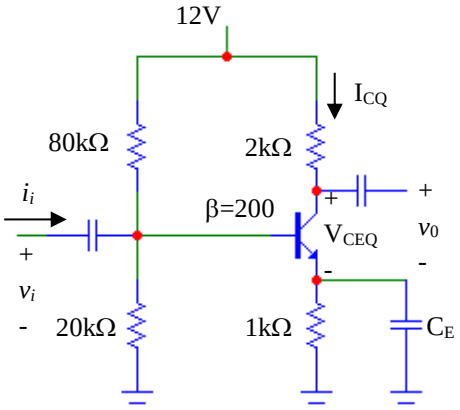
What happens to A_v, and Z_i if the circuit is modified as shown in the following figure?



5. For the following common emitter amplifier circuit:
   (a) Calculate V_{CEQ} and I_{CQ},

   (b) Calculate the small signal voltage gain ($A_v = \frac{v_0}{v_i}$) and the input impedance ($Z_i = \frac{v_i}{i_i}$), and

   (c) What will the small signal voltage gain and the input impedance be if C_E is removed from the circuit?



6. Determine R_B and R_C such that the transistor is in saturation with I_C=2mA and β_{forced}=20 when V_i=5V. Draw the voltage transfer characteristics (a plot of V_0 vs V_i) with these resistances.