Electronic Engineering
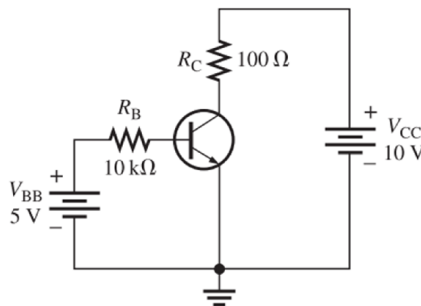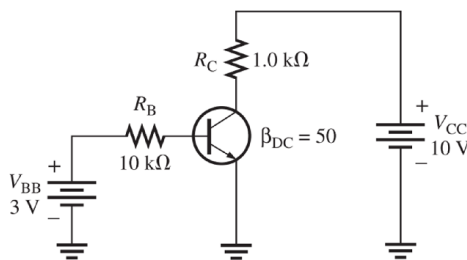
Sheet # 4: Transistors
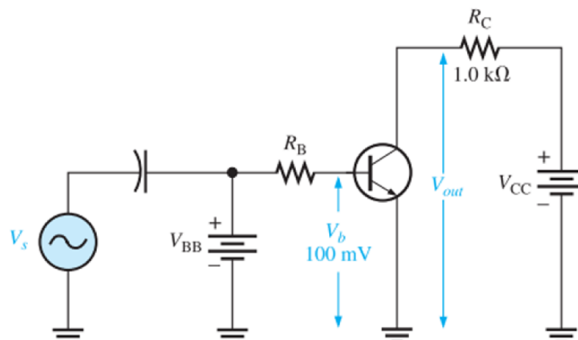
1- Determine IB, IC, IE, VBE, VCE, and VCB in the below circuit. The transistor has a β_{DC} = 150.

2- Determine whether or not the transistor in the below figure is in saturation. Assume $V_{CE(sat)=}$0.2 V.

3- Determine the voltage gain and the ac output voltage in the below figure if re'=50 ohm. Sketch the output voltage waveform.
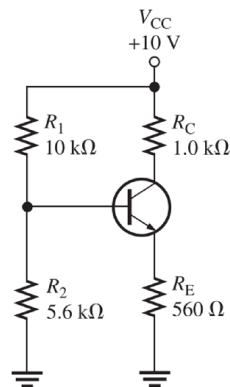

4- For the transistor circuit in the below figure:
   a. what is V_{CE} when V_{IN} = 0 V?

b. What minimum value of I_B is required to saturate this transistor if β_{DC} is 200? Neglect $V_{CE(sat)}$.

c. Calculate the maximum value of R_B when V_{IN}= 5 V.
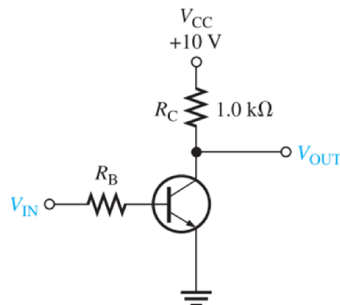
5- Determine VCE and IC in the stiff voltage-divider biased transistor circuit in the below figure if β_{DC} = 100.

6- Determine the voltage gain of the swamped amplifier in the below figure. Assume that the bypass capacitor has a negligible reactance for the frequency at which the amplifier is operated. Assume re'= 20 ohm.
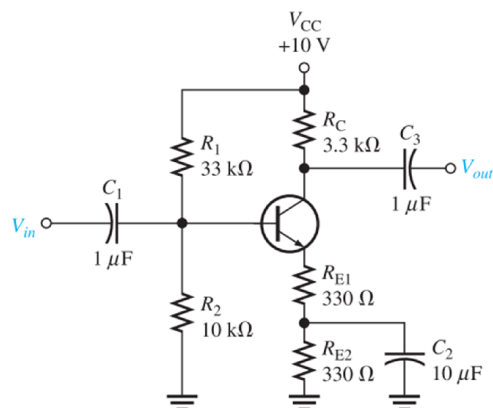
7- A certain cascaded amplifier arrangement has the following voltage gains: A_{v1}=10, A_{v2} = 15, and A_{v3} = 20. What is the overall voltage gain? Also express each gain in decibels (dB) and determine the total voltage gain in dB.