Sheet 3

1. For the circuit in figure 1:
   a) Determine the exact voltage gain for the unloaded emitter-follower
   b) What is the total input resistance
   c) A load resistance is capacitively coupled to the emitter. In terms of signal operation, the load appears in parallel with RE and reduces the effective emitter resistance. How does this affect the voltage gain?
   d) what value of RL will cause the voltage gain to drop to 0.9?

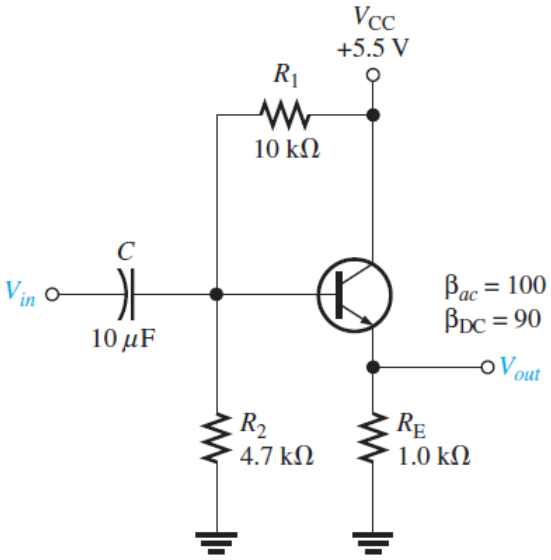

Figure .1

2. For the circuit in figure 2:
   a) Q1 and Q2 dc terminal voltages
   b) Overall βac
   c) re for each transistor
   d) Total input resistance
   e) Overall current gain Ai

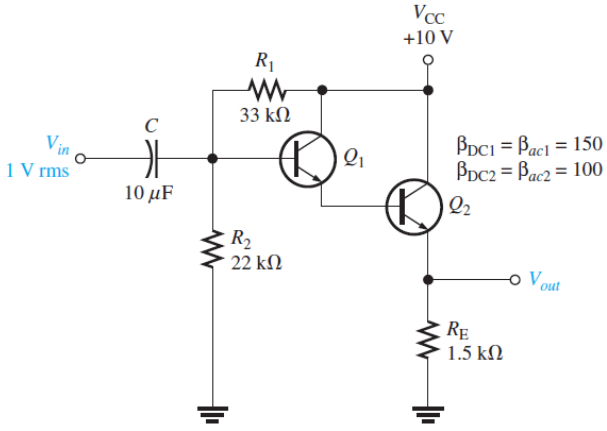

Figure.2

3. Calculate $Rin_{emitter}$, AV, AI, AP for CB amplifier in figure 3.

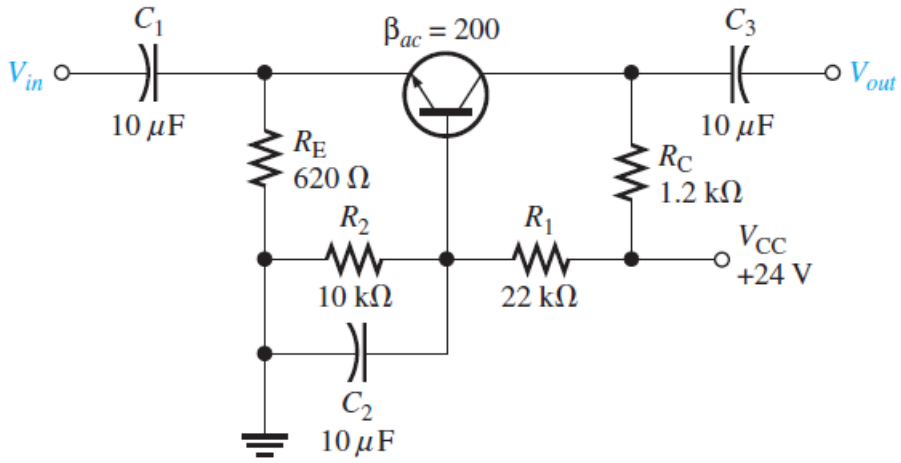

Figure .3

4. For the cascaded amplifier in figure 4:
   a) AV for each stage (dB)
   b) Overall AV (dB)
   c) If the circuit is driven by 75Ω, 75uV, and second stage is loaded with RL=18kΩ, repeat a & b

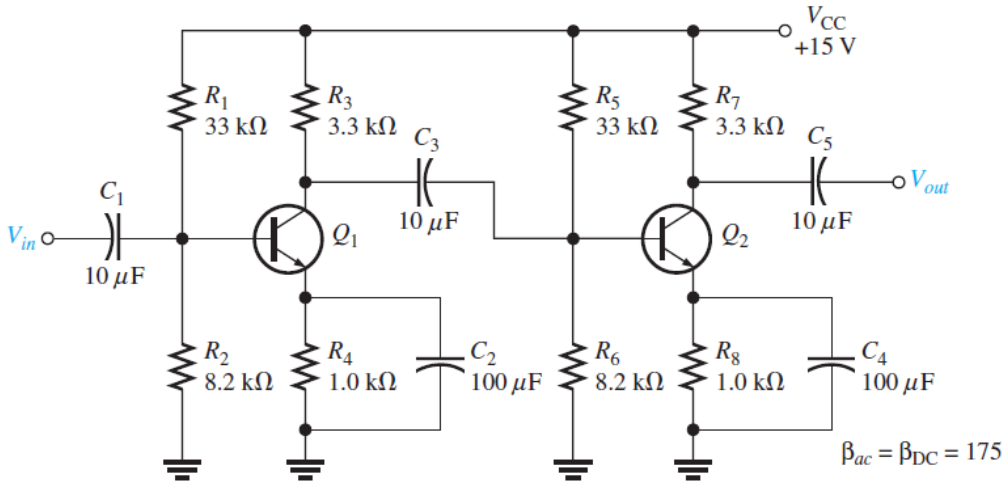

Figure .4.

5. For differential amplifier shown in figure 5:

Calculate the CMRR (in dB) for the circuit measurements of $V_d = 1\,\text{mV}$, $V_o = 120\,\text{mV}$, $V_C = 1\,\text{mV}$, and $V_o = 20\,\mu\text{V}$.

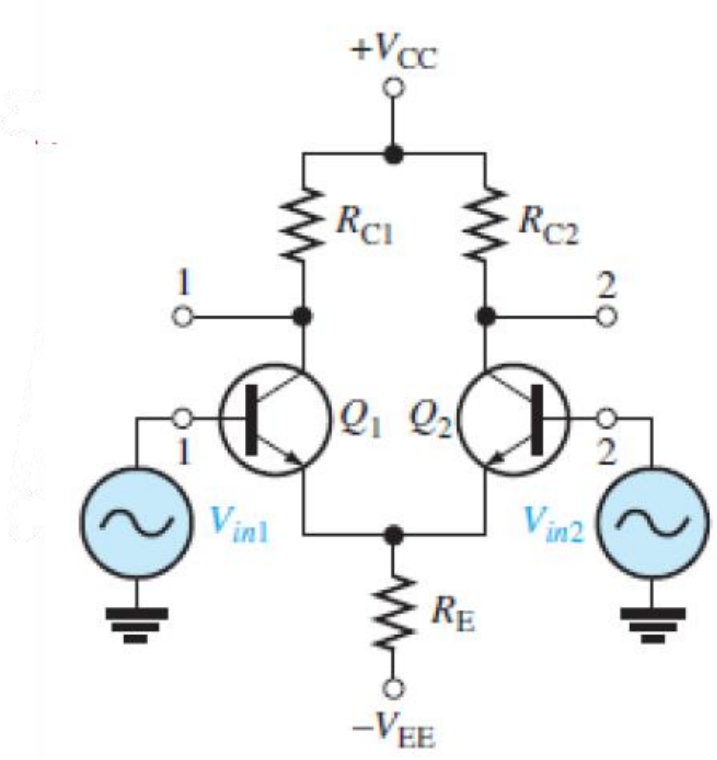

Figure 5.