Tutorial support for Assignment 1

The basic equations for answering the questions are all in the lecture notes. The missing ones such as handling circuits with Emitter Resistance are given in Class C lecture slides.

One aspect would be 'where to start':

One way to do this is work backwards – If I asked for AC output for A class, that would be peak values divided by 2 (slide 18 in class A notes)

So find the values that were not given like Ic. In the question, we have Re. So we can get Ic without know beta value. How? By looking at the voltage into Re… this is where the voltage divider and some circuit analysis comes handy.

Since Ie is equal to Ic, we have Ic now.

Next we need to find Vceq. To do this, we need to look where Vcc is going.

Vcc would be whatever Vceq is plus voltage drop across Rc and Re. We know Ie and Ic now (same), so finding Vceq is not a problem.

Hope this is helpful.

For C class amp, I have given you all the equations needed in the lecture notes.

For question 3, the simple way is since the voltage divider side circuit is in symmetry, we can just analyse only half of the circuit. So voltage is half.

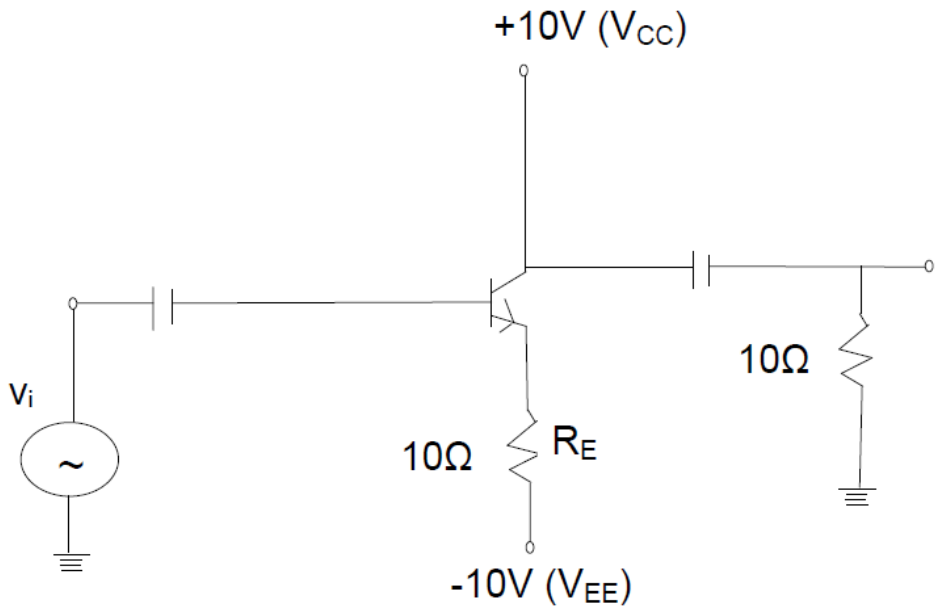
To find R2, we need to know what current is going through the resistors r1 and r2…

Remember that R2 need to provide enough voltage to forward bias the BJT….

If you still are wondering how to do, then give it a go and I can provide the solutions once the assignment submitted.

For support, I have included an example:

Calculate maximum ac output power and efficiency of the amplifier shown in fig. V_{BE} may be assumed negligibly small.



Solution:-

The operating point current and voltages in the circuit are:

$$I_{CQ} = I_E = \frac{|V_{EE}|}{R_E} = \frac{10V}{10\Omega} = 1A$$

And,

$V_{CEQ} = V_{CC} = 10V$

Therefore, maximum ac output power is,

$$P_{0(max)} = \frac{V_{CEQ} \cdot I_{CQ}}{2} = \frac{10 \times 1}{2} = 5W$$

To calculate the efficiency, η , the dc power drawn by collector-emitter circuit is,

$$P_{DC} = |V_{CC}| + |V_{EE}| \; I_{CQ}$$
$$= (10+10) \times 1 = 20W$$

Therefore efficiency,

$$\eta = \frac{P_{0(max)}}{P_{DC}} = \frac{5W}{20W} \times 100$$

$or\ \eta = 25\%$