## Diagram, schematic  Description automatically generatedDC analysis – Find the Operating Point

What do we know:

* Vbe the voltage from the base to emitter is about 0.7 volts (a diode drop)
* The collector current (Ic) = Beta \* Ib (the base current, assumes to be small at first)
* V+ ~ 15 volts
* V- ~ -15 volts
* Beta = !00 - 300

So Ve (The emitter voltage) is about -0.7 volts

So if we want Ic to be about 1 milliamp:

Re = Ic/Beta ~ 14volts/1.01 ma or about 14kohms (use a standard value, 12k)

Now choose an Rc to leave about half of the 15.7 volts across the transistor so

Rc = 15.7/1ma ~ 15kohms

The Biasing resistor Rb should be as high as reasonable give that Ib = Ic/Beta ~ 10 microamps and we do not want too high a voltage drop at the base so try Rb = 10k ohms (a 0.1 volt drop)

We now have set the Q-point of our amplifier.

## Small Signal or AC analysis

Redraw the circuit shorting out all large capacitors and supply voltages are now at AC ground and replace the transistor with it’s small signal model.
( I have added two small resistors R3 and R4 to make Multisim happy)



Now do a circuit analysis to calculate:

* The voltage gain
* The amplifier input impedance
* The amplifier output impedance