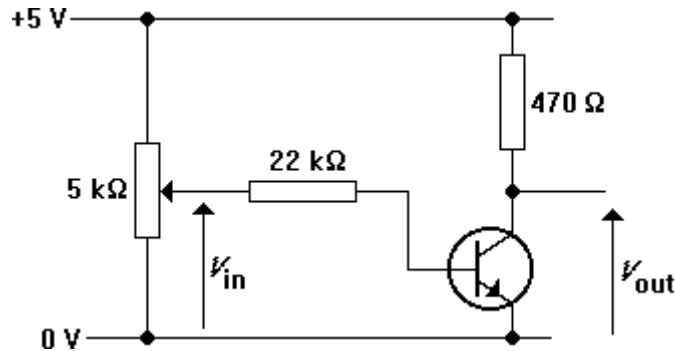
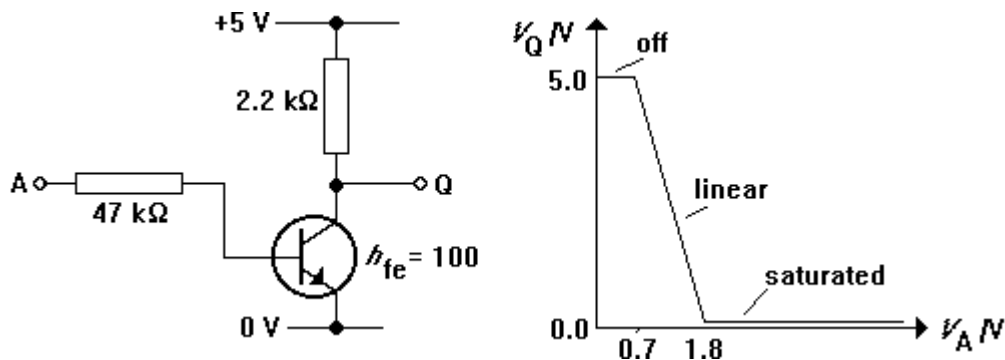


Exploring a bipolar transistor

This circuit will allow you to determine the h_{FE} of a BC107 transistor.



1. Assemble the circuit.
2. Use a double-beam CRO to look at V_{in} and V_{out} . Use 1 V/div, with 0 V at the bottom of the screen. If all is well, V_{out} should fall from 5 V to 0 V as V_{in} rises from 0 V to 5 V.
3. Measure the value of V_{out} for values of V_{in} covering the range 0.0 V to 5.0 V at intervals of 0.25 V.
4. Plot the data on a graph similar to that below. Join up the dots with three straight lines (off, linear and saturated).



5. Repeat steps 3 and 4, but looking at the base voltage instead of the collector voltage.
6. Use your graph to read off the value of V_{in} which makes V_{out} 2.0 V. By considering the voltage drop across the base and collector resistors, calculate values for I_b and I_c . Hence determine the value of h_{FE} for your transistor.
7. Replace the 2.2 kΩ resistor with 1 kΩ and 4.7 kΩ in turn. Note what effect this has on the $V_{out}-V_{in}$ graph.