Physics 517/617
Experiment 4A

Basic Experiment - Physics 517/617

1) Build the following circuit. Vary $R_1$ between 500 $\Omega$ and 50 K$\Omega$ (using a resistor box if possible). Use a 100 $\Omega$ resistor instead of the light bulb. Measure $V_{BE}$ and $I_C$. Determine $\beta$ ($h_{fe}$) for each of your measurements. Plot $I_B$ vs $I_C$. What is the saturation current and voltage ($V_{CE}$)? For what values of $R$ would this circuit make a good switch?

![Circuit Diagram 1](image1)

2) Build the following single stage common emitter amplifier.

- First build the circuit without the capacitor or sinusoidal source.
- Turn the resistance box until the $V_{CE}$ is equal to 5 volts.
- Check the $V_{BE}$ is .7 volts.
- Add the capacitor and sinusoidal generator to your circuit.

![Circuit Diagram 2](image2)

3) Measure the following properties of your amplifier and compare them to what you expect theoretically:

- operating point
- gain
- input impedance
- frequency response and frequency dependance of previous two quantities
- response to large signals

No additional work is required for Physics 617