

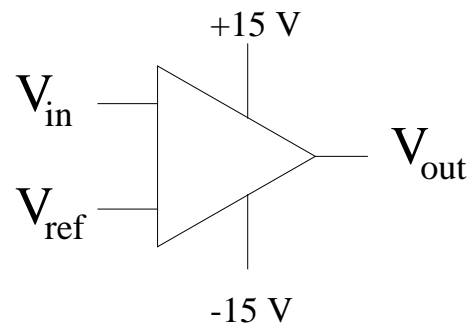
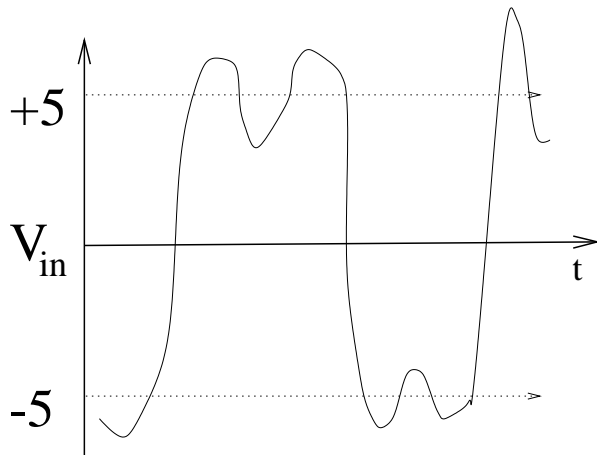
PHYSICS 3150

Total: 25 marks

Problem Set 2

due February 11, 2005

1. (10 marks) Sketch the output of the comparator for the following input waveform for the cases where; (a) $V_{\text{ref}} = +5 \text{ V}$ and (b) $V_{\text{ref}} = -5 \text{ V}$. How would you change the circuit to produce output voltages of $+5 \text{ V}$ and 0 V ?



2. (5 marks) Using an op-amp with a saturation voltage of 12 V and a 5 V DC source, design a Schmitt Trigger circuit which switches at an input voltage of around 1 V . The RMS noise level on the input source is around 10 mV . The maximum current the op-amp can produce is 15 mA but it can sink 25 mA .
3. (10 marks) Using the same op-amp as used in the previous question, design an astable multivibrator that produces a square-wave output with a period of 1 ms and output levels of 0 V and $+5 \text{ V}$.