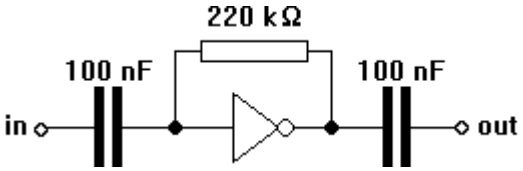
Measuring the gain of an amplifier

1. Construct the a.c. amplifier shown below using a 4069 NOT gate run off supply rails at +5 V and 0 V.



2. Use a signal generator to feed a 20 mV peak value sine wave at 1 kHz into the amplifier. Use a double-beam CRO to compare the signals at the output and the input.

3. Measure the peak values of both traces on the CRO screen. Use them to calculate the voltage gain of the amplifier (it should be between 30 and 50). Is it positive or negative?

4. Repeat the experiment for each of the input amplitudes shown in the table. Keep the frequency at 1 kHz and study the output waveforms for distortion.

Input amplitude/mV	Output amplitude/mV	voltage gain
20		
50		
100		
200		
500		

5. Now investigate how the gain of the amplifier depends on frequency of the input signal. Set the input amplitude to 20 mV. Measure the voltage gain at each of these frequencies in turn:

100 Hz 330 Hz 1 kHz 3.3 kHz 10 kHz 33 kHz.

6. Use your results to plot a gain-frequency graph for the amplifier on the axes below.