

UNIVERSITY OF CALIFORNIA, BERKELEY  
EE40: Introduction to Microelectronic Circuits Lab 1

Introduction to Circuits and Instruments Report

Name/SID: \_\_\_\_\_

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Section/TA: \_\_\_\_\_

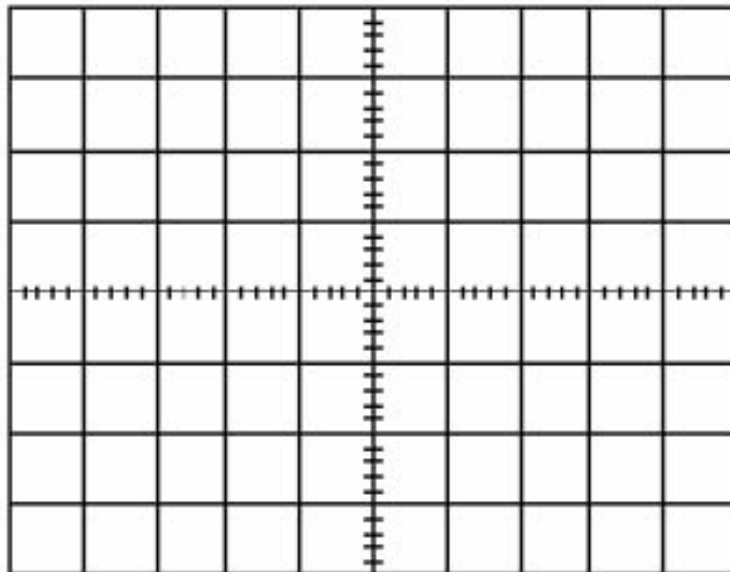
**Part I: Instrument practice**

(a) Record the voltages measured from the instruments below

Power Supply	Multi-Meter	Oscilloscope

Are they in good agreement? Which value do you think is more accurate?

(b) Draw the two sinusoidal signals you observed on the oscilloscope screen below. Label your axis with the scale settings, e.g. V/div for y-axis and s/div for x-axis.



(c) Record the manual and auto measured  $V_{pp}$ , period and frequency

	$V_{pp}$	Period	Frequency
Cursor			
Auto			

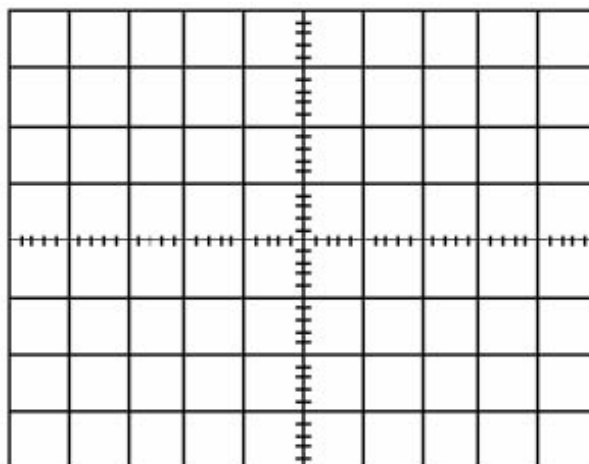
(d) Record the factory (read from color bars) and actual measured values of the resistors below

Factory	Measured

What was the tolerance of these resistors? Were the measured values within this tolerance?

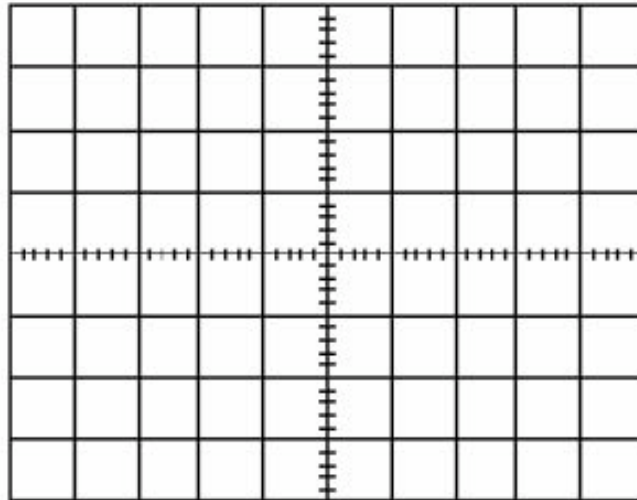
## Part II Circuit design and measurement

(a) Graph the I-V characteristic curve for the 1k resistor. Label your axis with the physical quantity and its unit.



What is the slope of this line and what is its significance?

(b) Graph the I-V characteristic curve for the light emitting diode (LED). Indicate what color you are using. Label your axis with the physical quantity and its unit.



What is the threshold voltage?

What happens when you switch the voltage polarity? What important function of diodes does this demonstrate?

(c) Order the brightness of the LED in the three different circuits with a single resistor, two resistors in series, and two resistors in parallel.

Explain why it happens in such an order.

(d) What is the upper limit of the frequency that your eyes can detect?

(e) Draw the circuit diagrams to show how you construct two LEDs blinking in phase and out of phase.