Laboratory Session: Week 3: Transducers

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Electro-Optic Transducers

Photoconductors

Photoconductor Resistance

In darkness: ~1.2 MΩ

In bright light: 1.63 kΩ

Light-Emitting Diodes (LEDs)

WORK SHEET HERE:

Supply Voltage	Voltage$_{Resistor}$	Voltage$_{LED}$	Current$_{LED}$ (V$_{resistor}$ / 1000)
0 V	0 V	0.006 V	0 A
0.5 V	0 V	.562 V	0 A
1.0 V	0 V	1.018 V	0 A
1.5 V	0 V	1.578 V	0 A
2.0 V	.006 V	2.072 V	$6*10^{-6}$ A
2.5 V	.242 V	2.286 V	$2.42*10^{-4}$ A
5.0 V	2.227 V	2.796 V	$2.23*10^{-3}$ A
10 V	6.590 V	3.436 V	$6.59*10^{-3}$ A
15 V	11.2 V	3.844 V	$1.12*10^{-2}$ A

At approximately what LED voltage does the LED start to glow? 2.0 V

Current (mA) vs Voltage (V)
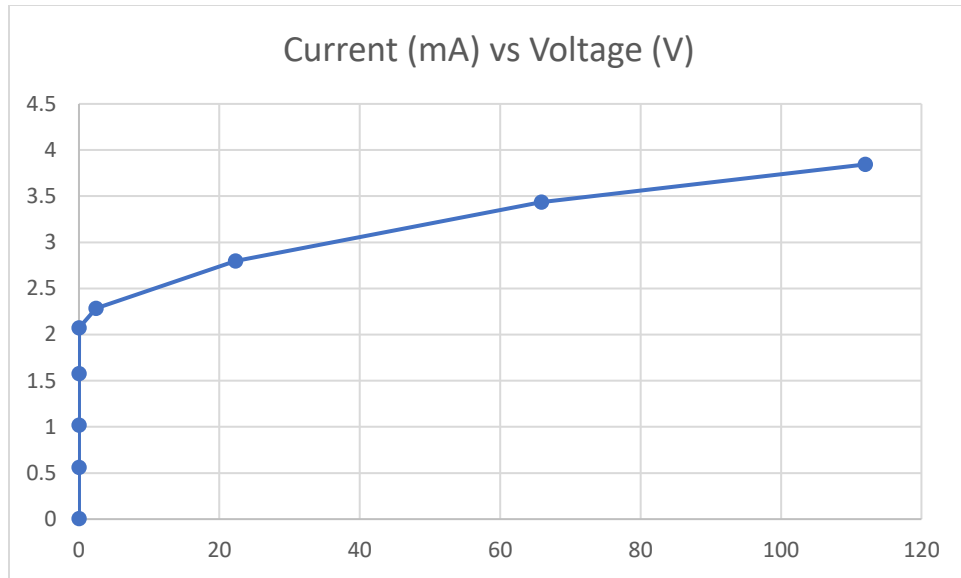
Phototransistors

WORK SHEET HERE: (Use DMM for your voltage measurements only!)

|	100 KΩ		10 KΩ	
	Voltage	**Calculated** Current	Voltage	**Calculated** Current
Object Above	1.543 V	$1.543*10^{-5}$ A	0.107 V	$1.07*10^{-5}$ A
No Object	0.005 V	$5*10^{-8}$ A	0.143 V	$1.43*10^{-5}$ A

Electro-Mechanical Transducers

Motors and Generators

WORK SHEET HERE:

Duty Cycle %	Average Motor Volts	Motor Current Amps
20	1.314 V	0 A
30	1.859 V	0.08 A
40	2.185 V	0.08 A
50	2.729 V	0.08 A
60	3.275 V	0.08 A
70	3.821 V	0.08 A

80	4.369 V	0.08 A
90	4.916 V	0.08 A
80	4.579 V	0.08 A
70	3.824 V	0.08 A
60	3.275 V	0.08 A
50	2.736 V	0.08 A
40	2.185 V	0.08 A
30	1.636 V	0.08 A
20	1.089 V	0.08 A
10	771 mV	0 A

Voltage (V) vs Current (A)
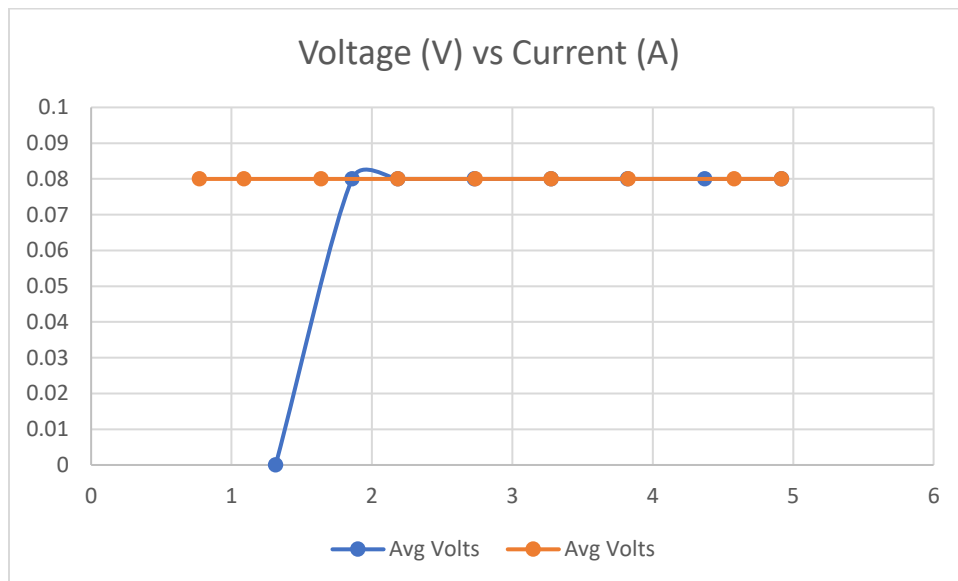
What voltage and current are required to just start the motor spinning? 0.1 V and 0.08 A