Photoelectric Effect

Fundamental Physics Experiment Worksheets

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https://sites.google.com/gms.ndhu.edu.tw/phys

Photoelectric Effect Experiment

Go to the Fundamental Physics Experiment website and choose the "2-online-1-Photoelectric Effect".

Part 1 Photoelectric Effect Experiment

Open Simulation on the website and make sure you can see the whole experiment.

I. Press the reset buttum and change the wavelength parameter at least 3 times, please take a screenshot and write down what you observed in the simulation. (5%)

Wavelength __ (nm)	Wavelength __ (nm)	Wavelength __ (nm)

II. Press the reset buttum and change the intensity parameter at least 3 times, please take a screenshot and write down what you observed in the simulation. (5%)

Intensity __ (W/m^2)	Intensity __ (W/m^2)	Intensity __ (W/m^2)

III. Press the reset buttum and change the voltage parameter at least 3 times, please take a screenshot and write down what you observed in the simulation. (5%)

Voltage __ (V)	Voltage __ (V)	Voltage __ (V)

IV. Press the reset buttum and Set metal to Sodium, area to 0.1 (cm^2), intensity to 5.0 (W/m^2), and voltage to 0.0 (V), then complete the following form. (4%)

Wavelength (nm)	Current (μA)
250	
380	
450	
532	
600	

V. From Problem IV, (a)plot the wavelength and current graph and (b)explain why. (8%)

VI. Press the reset buttum and Set metal to Sodium, area to 0.1 (cm^2), voltage to 0.0 (V), and wavelength to 450 (nm), then complete the following form. (4%)

Intensity	Current (μA)
5	
10	

15	
20	
25	
30	

VII. From Problem VI, (a) plots the intensity and current graph and (b) explains why. (8%)

VIII. Press the reset buttum and Set metal to Sodium, area to 0.1 (cm^2), voltage to 0.0 (V), and wavelength to 600 (nm), then complete the following form. (4%)

Intensity	Current (μA)
5	
10	
15	
20	
25	
30	

IX. From Problem VIII, (a) plots the intensity and current graph and (b) explains why. (8%)

X. Press the reset buttum and Set metal to Sodium, area to 0.1 (cm^2), wavelength to 180 (nm), and intensity to 5.0, then complete the following form. (4%)

Voltage (V)	Current (μA)

0	
-0.1	
-0.2	
-0.3	
-0.4	
-0.5	
-0.6	
-0.7	
-0.8	
-0.9	
-1	
-1.1	
-1.2	
-1.3	
-1.4	
-1.5	
-1.6	
-1.7	
-1.8	
-1.9	
-2	
-2.1	
-2.2	
-2.3	
-2.4	
-2.5	
-2.6	

-2.7	
-2.8	
-2.9	
-3	
-3.1	
-3.2	
-3.3	
-3.4	
-3.5	
-3.6	
-3.7	
-3.8	
-3.9	
-4	
-4.1	
-4.2	
-4.3	
-4.4	
-4.5	
-4.6	
-4.7	
-4.8	
-4.9	
-5	

XI. From Problem X, (a)plot the voltage and current graph and (b)explain why. (c)and write down the stopping voltage. (8%)

XII. Press the reset buttum and Set metal to Sodium, intensity to 5.0, then complete the following form. (4%)

Wavelength (nm)	Stopping voltage (V)
250	
380	
450	
532	
600	

XIII. From Problem XII, (a) plots the wavelength and stopping voltage graph and (b) explains why. (8%)

XIV. Set metal to Sodium, intensity to 5.0, and voltage to 0.0. Find the wavelength of light for the critical current and calculate Planck's constant. Please write down the whole calculation process. (10%)

Part 2 Conclusion.

I. Please write down the applications of the photoelectric effect and explain how its physical mechanism works. (15%)