

**NAME – RAJDEEP JAISWAL**

**BRANCH – BTECH C.S.E**

**UID – 20BCS2761**

**SUB – QUANTUM AND SEMICONDUCTOR PHYSICS**

**SEC/GROUP – 26(B)**

**END SEMESTER WORKSHEET**

**SUBJECT CODE 21E-20SPP-182\_20BCS26\_B**

AIM -  
To calculate the different frequencies at constant intensity for copper using photoelectric effect.

### APPARATUS-

<b>Sr.No</b>	<b>Equipme nt</b>
1.	Voltmeter
2.	Ammeter
3.	Rheostat
4.	Battery

1

**PROCEDURE-**

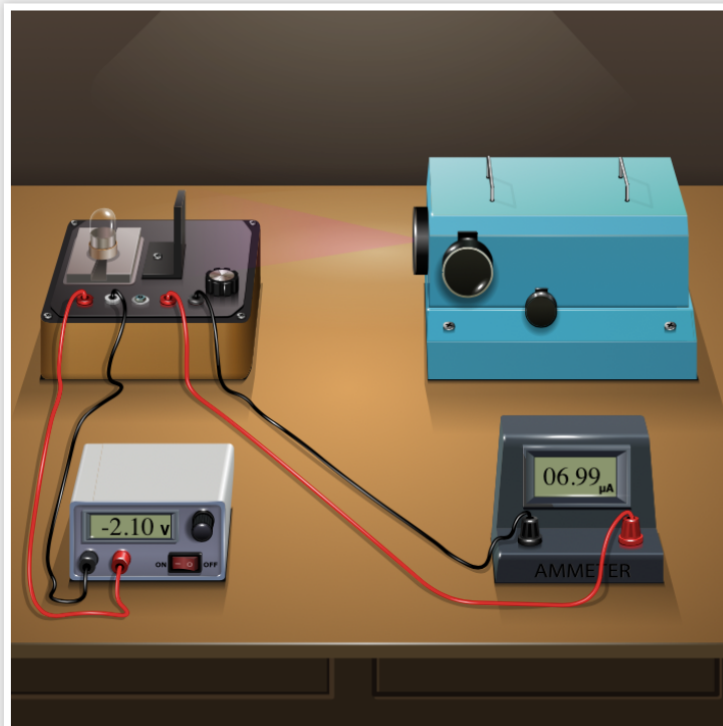
1. Select the material for study in photoelectric effect.
2. Select area of the material, wave-length, intensity of incident light.
3. Switch on the light source.
4. Measure the reverse current for various reverse voltages.
5. Plot the current voltage graph.
6. Repeat the experiment by varying the intensity for a particular wavelength of incident light.

**OBSERVATIONS :**

1. MATERIAL=COPPER
2. AREA OF PLATE=0.2cm<sup>2</sup>
3. WAVELENGTH( $\lambda$ )=136nm
4. INTENSITY OF LIGHT( $I_1$ )= 5 w/m<sup>3</sup>
5. INTENSITY OF LIGHT( $I_2$ )= 10 w/m<sup>3</sup>
6. INTENSITY OF LIGHT( $I_3$ )= 15 w/m<sup>3</sup>

# SIMULATION -

## Photo Electric Effect



### VARIABLES

Choose Material:

Copper ▾

Area of Plate : 0.2 cm<sup>2</sup>



Intensity of Light : 15 w/m<sup>2</sup>



Voltage Applied : -2.1 V



Wavelength of Light : 136 nm



SWITCH OFF LIGHT

RESET

$I_1$		$I_2$		$I_3$	
$v$	$i$	$v$	$i$	$v$	$i$
0	$1.00 \times 10^{-5}$	0	$2.00 \times 10^{-5}$	0	$3 \times 10^{-5}$
-0.2	$9.88 \times 10^{-6}$	-0.3	$1.95 \times 10^{-5}$	-0.4	$2.86 \times 10^{-5}$
-0.5	$9.2 \times 10^{-6}$	-0.6	$1.79 \times 10^{-5}$	-0.8	$2.47 \times 10^{-5}$
-0.8	$8.23 \times 10^{-6}$	-0.9	$1.56 \times 10^{-5}$	-1.2	$1.94 \times 10^{-5}$
-1.1	$6.9 \times 10^{-6}$	-1.2	$1.30 \times 10^{-5}$	-1.6	$1.40 \times 10^{-5}$
-1.4	$5.56 \times 10^{-6}$	-1.5	$1.02 \times 10^{-5}$	-2.0	$9.29 \times 10^{-6}$
-1.7	$4.8 \times 10^{-6}$	-1.8	$7.08 \times 10^{-6}$	-2.4	$5.69 \times 10^{-6}$
-2.0	$4.1 \times 10^{-6}$	-2.1	$5.52 \times 10^{-6}$	-2.8	$3.23 \times 10^{-6}$
-2.3	$1.7 \times 10^{-6}$	-2.4	$3.79 \times 10^{-6}$	-3.2	$1.70 \times 10^{-6}$
-2.6	$1.44 \times 10^{-6}$	-2.7	$2.50 \times 10^{-6}$	-3.6	0
-2.9	0	-3.3	0		

### **SOURCES OF ERROR-**

**There may occur Errors due to the following:-**

1. Instrumental related issues,
2. Wrong readings,
3. Loose and wrong connections,
4. Varying temperature
5. Resistivity of connecting wires.

### **RESULT OCCURS**

1. The photoelectric effect is an instantaneous phenomenon. There is not medelay between the incidence of light and emission of photoelectrons.
2. The number of photoelectrons emitted is proportional to the intensity of incident light. Also, the energy of emitted photoelectrons is independent of incident light.

The energy of emitted photoelectrons is directly proportional to the frequency of incident ligh

**LEARNING OUTCOMES**

- It will provide the modest experience that allows students to develop and improve their experimental skills and develop ability to analyzedata.
- Ability to demonstrate the practical skill on measurements and instrumentation techniques of some Physics experiments. Students will develop the ability to use appropriate physical concepts to obtain quantitative solutions to problems inphysics.
- Students will demonstrate basic experimental skills by setting up laboratory equipment safely and efficiently, plan and carry out experimental procedures, and report verbally and in written language the results of theexperiment.
- Students will develop skills by the practice of setting up and conducting an experimentwithdueregardstominimizing measurement error.

*EVALUATION COLUMN (To be filled by concerned faculty only)*

Sr. No.	Parameters	Maximum Marks	Marks Obtained
1.	Worksheet completion including writing learning objectives/Outcomes. (To be submitted at the end of the day)	10	
2.	Post Lab Quiz Result.	5	
3.	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.	5	
4.	Total Marks	20	
5.	Teacher’s Signature (with date)		



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