



**Shantilal Shah Engineering College,
Bhavnagar**

General Department



Practical Journal

Subject: Physics (3110018)

Branches: IT & Electrical (Group-II)

Shantilal Shah Engineering College, Bhavnagar



Certificate

This is to certify that Shri/Kum. _____
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has satisfactorily completed his/her term work of the
subject PHYSICS of code 3110011/3110018 during the
academic year _____ and submitted on _____

Date:

Faculty in charge

List of Experiments and Rubrics for Assessment

Code	Objective	Arrangement (All components arranged in perfect manner without any help)	Reading (Student is able to take reading and keeping record properly with UNITS)	Calculation (Done all calculations perfect in time)	Graph (Completed Graph with proper analysis)	Understanding/ Conclusion (Excellent understanding and proper conclusion is written)	VIVA	Attendance	TOTAL
P_1	To study V-I Characteristics of P-N junction diode.	10	5	5	5	5	10	10	50
P_2 (VLAB)	1. To determine the Hall voltage developed across the sample material. 2. To calculate the Hall coefficient and the carrier concentration of the sample material.	5	10	5	0	10	10	10	50
P_3 (VLAB)	Determination of Plank's constant.	5	10	5	0	10	10	10	50
P_4	Measurement of the Numerical Aperture (NA) of the optical fiber.	10	10	5	0	5	10	10	50
P_5 (VLAB)	To calculate beam divergence and spot size of the given laser beam.	5	5	5	10	5	10	10	50
P_6 (VLAB)	To determine the resistivity of semiconductors by Four probe Method.	5	10	5	0	10	10	10	50
P_7	Understand the function of CRO and measure the <i>rms</i> voltage and frequency of AC signal using CRO.	10	10	5	0	5	10	10	50
P_8	To find zener breakdown voltage.	10	5	5	5	5	10	10	50
P_9 (VLAB)	1. To determine the stopping potential from the graph of photocurrent versus applied potential. 2. To determine the Planck's constant from the graph of kinetic energy versus frequency. 3. To determine work function of given material.	5	5	5	10	5	10	10	50

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Physics (Practical)-3110018

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Sr. No.	Code	Objective	Arrangement	Reading	Calculation	Graph	Understanding/ Conclusion	VIVA	Attendance	TOTAL	SIGN
1	P_1	To study V-I Characteristics of P-N junction diode.	(10)	(5)	(5)	(5)	(5)	(10)	(10)	(50)	
2	P_2 (VLAB)	1. To determine the Hall voltage developed across the sample material. 2. To calculate the Hall coefficient and the carrier concentration of the sample material.	(5)	(10)	(5)	(0)	(10)	(10)	(10)	(50)	
3	P_3 (VLAB)	Determination of Plank's constant.	(5)	(10)	(5)	(0)	(10)	(10)	(10)	(50)	
4	P_4	Measurement of the Numerical Aperture (NA) of the optical fiber.	(10)	(10)	(5)	(0)	(5)	(10)	(10)	(50)	
5	P_5 (VLAB)	To calculate beam divergence and spot size of the given laser beam.	(5)	(5)	(5)	(10)	(5)	(10)	(10)	(50)	
6	P_6 (VLAB)	To determine the resistivity of semiconductors by Four probe Method.	(5)	(10)	(5)	0	(10)	(10)	(10)	(50)	
7	P_7	Understand the function of CRO and measure the <i>rms</i> voltage and frequency of AC signal using CRO.	(10)	(10)	(5)	0	(5)	(10)	(10)	(50)	

8	P_8	To find zener breakdown voltage.	(10)	(5)	(5)	(5)	(5)	(10)	(10)	(50)	
9	P_9 (VLAB)	1. To determine the stopping potential from the graph of photocurrent versus applied potential. 2. To determine the Planck's constant from the graph of kinetic energy versus frequency. 3. To determine work function of given material.	(5)	(5)	(5)	(10)	(5)	(10)	(10)	(50)	



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Physics Laboratory Manual

Experiment-1 (P_1)

Code	Objective of the experiment	Course Outcome
P_1	To study V-I Characteristics of P N junction Diode	CO-2

❖ **Objective:** To study V-I Characteristics of P N junction Diode

❖ **Instrument Used:** Diode Characteristics Trainer (NV6501)

❖ **Items Required:**

1. Semiconductor Diode, Regulated Power Supply
2. Connecting wire

❖ **Procedure:**

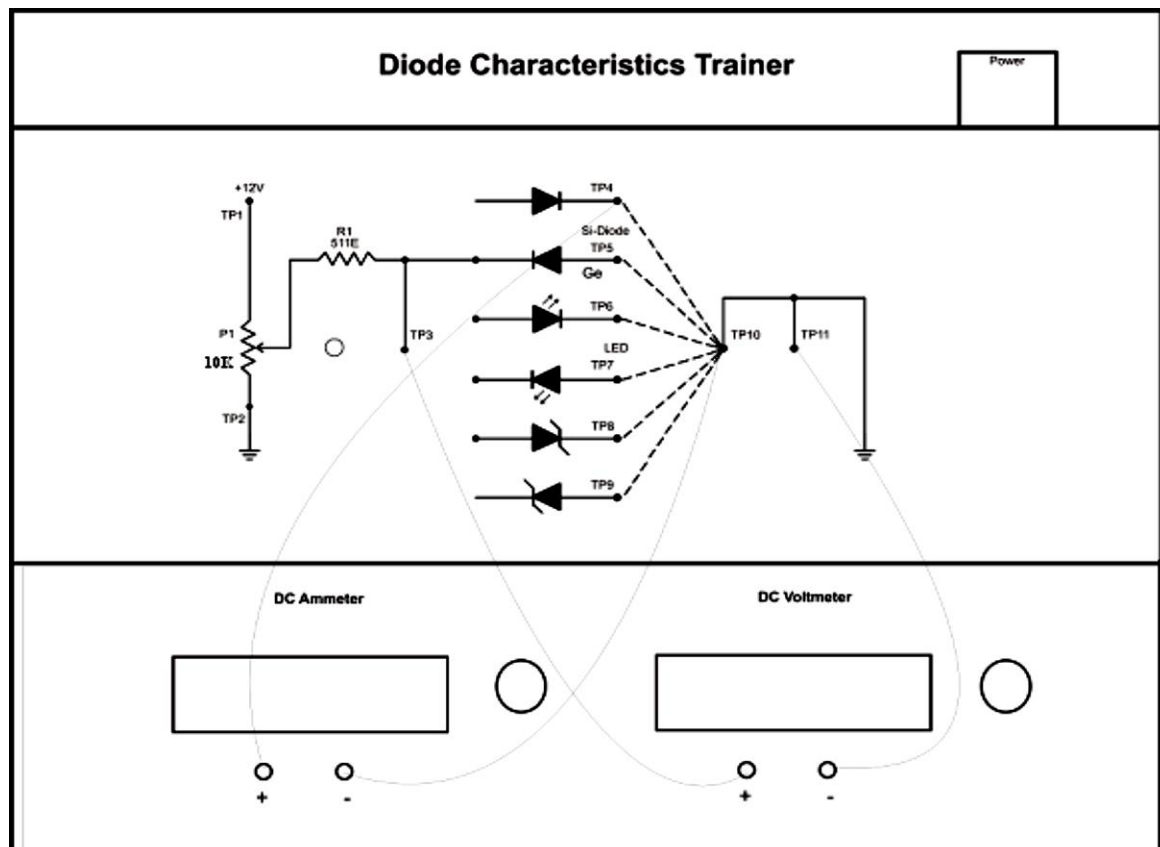
Study of Forward bias characteristics

1. Before switch 'On' the supply rotate potentiometer P1 fully in CCW (counter clockwise direction).
2. Connect Ammeter between **TP4** and **TP10**, to measure diode current I_F (mA) & set Ammeter at **200 mA range** (as shown in fig. 1).
3. Connect Voltmeter across **TP3** and **TP11**, to measure diode voltage V_F & set Voltmeter at **20 V range**.
4. Switch 'On' the power supply.
5. Vary the potentiometer P1 so as to increase the value of diode voltage V_D from 0 to 1 V (0.83 V) in steps and measure the corresponding values of diode current I_D in mA and note down in the Observation Table-(1).
6. Switch 'Off' the supply.

Study of Reverse bias characteristics

7. Before switch 'On' the supply rotate potentiometer P1 fully in CCW (counter clockwise direction).
8. Connect Ammeter between **TP5** and **TP10**, to measure diode current I_R (μA) & set Ammeter at **200 μA** range (as shown in fig. 1).
9. Connect Voltmeter across **TP3** and **TP11**, to measure diode voltage V_R & set Voltmeter at **20 V** range.
10. Switch 'On' the power supply.
11. Vary the potentiometer P1 so as to increase the value of diode voltage V_R from 0 to 15 V in steps and measure the corresponding values of diode current I_R in μA and note down in the Observation Table-(2).
12. Switch 'Off' the supply.
13. Plot a curve between diode voltage V_D/ V_R and diode current I_D/ I_R using suitable scale, with the help of Observation Table. This curve is the required characteristics curve of Si diode.

❖ Circuit Diagram:



❖ **Observation Table-1:**

Sr. No.	Forward Bias Voltage, V_F (volt)	Forward Bias Current, I_F (mA)	Static Resistance $R = V/I$ (Ohm)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			

❖ **Calculation:**

➤ From the graph:

Dynamic Resistance of diode is, $R_d = \frac{\Delta V_F}{\Delta I_F}$

❖ **Observation Table-2:**

Sr. No.	Reverse Bias Voltage, V_R (volt)	Reverse Bias Current, I_R (μA)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

❖ **Graph:** I v/s V graph is shown on page no ____.

❖ **Result:**

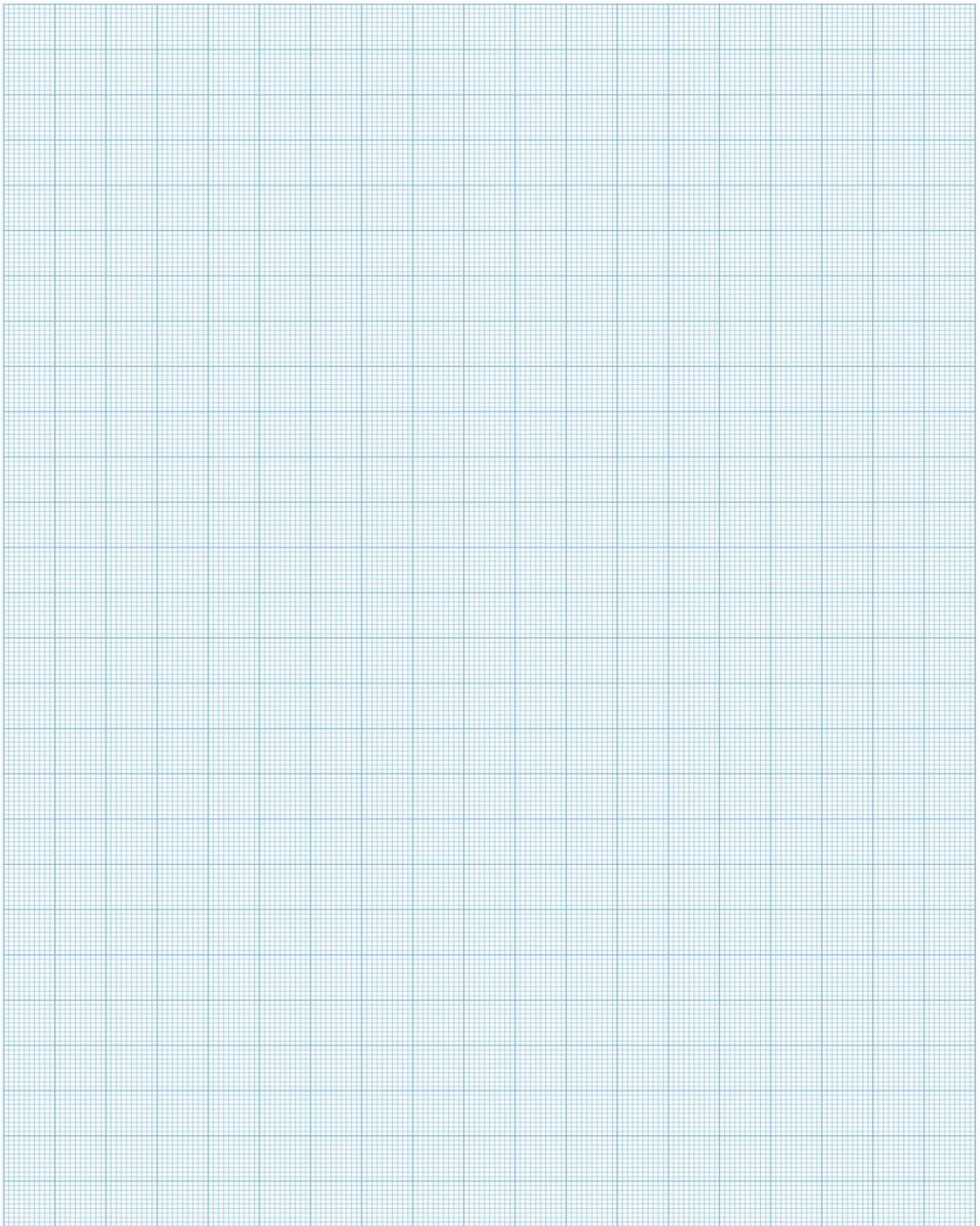
- 1) The dynamic resistance of the diode, $R_d = \dots\dots\dots$ Ohm.
- 2) The static resistance of the diode is $\dots\dots\dots$ ohm with value of current $\dots\dots\dots$ mA and value of voltage is $\dots\dots\dots$ volt.
- 3) Breakdown voltage for the diode is $\dots\dots\dots$ volt.

Code	Experiment	Arrangement (10)	Reading (5)	Calculations (5)	Graph (5)	Understanding /Calculation (5)	viva (10)	Attendance (10)	Total (50)
P_1	p-n junction diode								

SIGN

Scale: X-axis: 1 cm =

Y-axis: 1 cm =



Physics Laboratory Manual

Experiment-2 [P_2 (VLAB)]

Code	Objective of the experiment	Course Outcome
P_2 (VLAB)	1. To determine the Hall voltage developed across the sample material. 2. To calculate the Hall coefficient and the carrier concentration of the sample material	CO-4

⌘ Website link: <http://vlab.amrita.edu/?sub=1>

❖ **Objective:**

1. To determine the Hall voltage developed across the sample material.
2. To calculate the Hall coefficient and the carrier concentration of the sample material.

❖ **Apparatus:**

Two solenoids, Constant current supply, four probe, Digital gauss meter, Hall Effect apparatus (which consist of Constant Current Generator (CCG), digital milli voltmeter and Hall probe).


❖ **Procedure:**

Controls




◆ **Combo box**

 **Select procedure:** This is used to select the part of the experiment to perform.




- 1) Magnetic field Vs Current.
- 2) Hall Effect setup.

 **Select Material:** This slider activates only if Hall Effect setup is selected. And this is used to select the material for finding Hall coefficient and carrier concentration.

◆ **Button**

-  **Insert Probe/ Remove Probe:** This button used to insert/remove the probe in between the solenoid.
-  **Show Voltage/ Current:** This will activate only if Hall Effect setup selected and it used to display the Hall voltage/ current in the digital meter.
-  **Reset:** This button is used to repeat the experiment.

◆ **Slider**

-  **Current:** This slider used to vary the current flowing through the Solenoid.
-  **Hall Current:** This slider used to change the hall current
-  **Thickness:** This slider used to change the thickness of the material selected.

❖ **Procedure for doing the simulation:**

◆ **To measure the magnetic field generated in the solenoid**

- Select **Magnetic field Vs Current from** the procedure combo-box.
- Click **Insert Probe** button
- Placing the probe in between the solenoid by clicking the wooden stand in the simulator.
- Using Current slider, varying the current through the solenoid and corresponding magnetic field is to be noted from Gauss meter.

◆ Hall Effect apparatus

- Select **Hall Effect Setup** from the **Select the procedure** combo box
- Click **Insert Hall Probe** button
- Placing the probe in between the solenoid by clicking the wooden stand in the simulator.
- Set "**current slider**" value to minimum.
- Select the material from "Select Material" combo-box.
- Select the Thickness of the material using the slider **Thickness**.
- Vary the Hall current using the slider **Hall current**.
- Note down the corresponding Hall voltage by clicking "show voltage" button.
- Then calculate Hall coefficient and carrier concentration of that material using the equation

$$R_H = V_{Ht} / (I * B) \quad \dots\dots\dots(4)$$

Where R_H is the Hall coefficient

$$R_H = 1 / ne \quad \dots\dots\dots(5)$$

And n is the carrier concentration

- Repeat the experiment with different magnetic field.

❖ **Observation Table-(1):**

Trial No:	Current through solenoid	Magnetic field generated
1		
2		

❖ **Observation Table-(2):** Material: _____

Trial No:	Magnetic Field (Tesla T)	Thickness (t) (m)	Hall current, (mA)	Hall Voltage (mV)	R_H
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

❖ **Calculation:**

1) For Magnetic Field =..... and thickness =.....

2) For Magnetic Field =..... and thickness =.....

❖ **Result:**

(1) Hall Coefficient of the material, $R_H = \dots\dots\dots \text{m}^3/\text{C}$

(2) Carrier concentration of the material, $n = \dots\dots\dots \text{m}^{-3}$

Code	Experiment	Arrangement (5)	Reading (10)	Calculations (5)	Graph (0)	Understanding /Calculation (10)	viva (10)	Attendance (10)	Total (50)
P_2	Hall Effect								

SIGN

Physics Laboratory Manual

Experiment-3 [P_3 (VLAB)]

Code	Objective of the experiment	Course Outcome
P_3 (VLAB)	Determination of Planck's constant	CO-3

⌘ Website link: <http://vlab.amrita.edu/?sub=1>

❖ **Objective:** Determination of Planck's constant.

❖ **Apparatus:**

0-10 V power supply, a one way key, a rheostat, a digital milliammeter, a digital voltmeter, a 1 K resistor and different known wavelength LED's (Light-Emitting Diodes)

❖ **Procedure:**

1. After the connections are completed, click on 'Insert Key' button.
2. Click on the combo box under 'Select LED' button.
3. Click on the 'Rheostat Value' to adjust the value of rheostat to 500 Ω .
4. Corresponding voltage across the LED is measured using a voltmeter, which is the knee voltage.
5. Repeat, by changing the LED and note down the corresponding knee voltage.
6. Calculate h using formula, $h = \frac{e \lambda V}{c}$

❖ **Observation Table:**

Sr. No.	Colour of LED	Wavelength, λ (nm)	Knee Voltage, V (V)	λV (nm · V)	Average λV
1	Red				
2	Green				
3	Yellow				
4	Blue				

❖ **Calculation:**

($e = 1.6 \times 10^{-19}$ C, $c = 3 \times 10^8$ m/s)

➤ Plank's Constant, $h = \frac{e}{c}$ (average λV) = J s.

❖ **Result:** Value of Plank's constant is J s.

Code	Experiment	Arrangement (5)	Reading (10)	Calculations (5)	Graph (0)	Understanding /Calculation (10)	viva (10)	Attendance (10)	Total (50)
P_4	Planck's constant								

SIGN

Physics Laboratory Manual

Experiment-4 (P_4)

Code	Objective of the experiment	Course Outcome
P_4	Measurement of the Numerical Aperture (NA) of the fiber.	CO-3

❖ **Objective:** Measurement of the Numerical Aperture (NA) of the fiber.

❖ **Instrument Used** : Fiber Optics Trainer (Sciencetech 2502)

❖ **Items Required:**

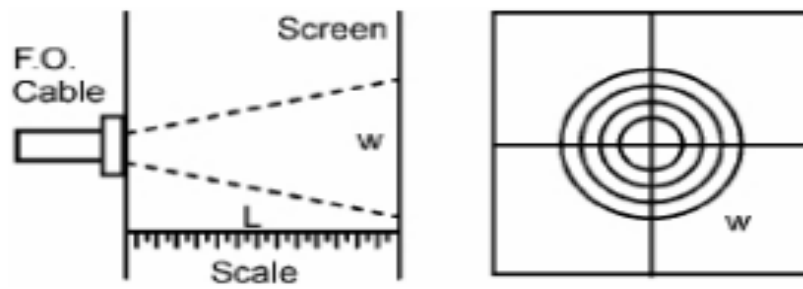
1. ST2502 trainer with power supply cord
2. Optical Fiber cable.
3. Numerical Aperture measurement Jig/Paper & Scale

❖ **Procedure:**

1. Connect the Power supply cord to mains supply and to the trainer ST2502.
2. Connect the frequency generator's 1 KHz sine wave output to input of emitter 1 circuit. Adjust its amplitude at 5 V pp.
3. Connect one end of fiber cable to the output socket of emitter 1 circuit and the other end to the numerical aperture measurement jig. Hold the white screen facing the fiber such that its cut face is perpendicular to the axis of the fiber.
4. Hold the white screen with 4 concentric circles (10, 15, 20 & 25 mm diameter) vertically at a suitable distance to make the red spot from the fiber coincide with 10 mm circle.
5. Record the distance of screen from the fiber end **L** and note the diameter **W** of the spot.

6. Compute the numerical aperture from the formula: $NA = \frac{W}{\sqrt{4L^2 + W^2}} = \sin \theta_{\max}$

❖ Diagram:



Numerical Aperture measurement Jig/Paper & Scale

❖ Observation Table:

Sr. No.	Diameter of the spot (W)	Distance between screen and fibre (L)	Numerical Aperture (NA)
1.	10 mm		
2.	15 mm		
3.	20 mm		
4.	25 mm		

❖ Calculations:

$$(1) NA = \frac{W}{\sqrt{4L^2 + W^2}}$$

$$(2) NA = \frac{W}{\sqrt{4L^2 + W^2}}$$

$$(3) NA = \frac{W}{\sqrt{4L^2 + W^2}}$$

$$(4) NA = \frac{W}{\sqrt{4L^2 + W^2}}$$

❖ **Result:** The N.A. of fiber measured is using trigonometric formula.

Code	Experiment	Arrangement (10)	Reading (10)	Calculations (5)	Graph (0)	Understanding /Calculation (5)	viva (10)	Attendance (10)	Total (50)
P_3	NA of Fibre Optic								

SIGN

Physics Laboratory Manual

Experiment-5 [P_5 (VLAB)]

Code	Objective of the experiment	Course Outcome
P_5	To calculate the beam divergence and spot size of the given laser beam.	CO-3

⌘ Website link: <http://vlab.amrita.edu/?sub=1>

❖ **Objective:** To calculate the beam divergence and spot size of the given laser beam.

❖ **Apparatus:** A laser source, An ammeter, Micrometer Screw gauge

❖ **Procedure:**

1. The experimental arrangement is shown in the simulator. A side view and top view of the setup is given in the inset.
2. The start button enables the user to start the experiment.
3. From the combo box, select the desired laser source.
4. Then fix a detector distance, say 100 cm, using the slider Detector distance, z. The z distance can be varied from 50 cm to 200 cm.
5. For a particular z distance, change the detector distance x, from minimum to maximum. Using the slider detector distance, x, The micrometer distances and the corresponding output currents are noted. The x distances can be read from the zoomed view of the micrometer and the current can be note from the digital display of the output device.
6. Draw the graph and calculate the beam divergence and spot size using the steps given above.

❖ **Observations:**

To find the Least Count of Screw gauge:

- One pitchscale division (n) = mm
- Number of divisions on head scale (m) =
- Least Count (L.C) = n/m = mm

❖ **Observation Table:**

For Z_1 = cm			For Z_2 = cm		
Sr. No.	Distance, x (mm)	Current, I (mA)	Sr. No.	Distance, x (mm)	Current, I (mA)
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		

❖ **Calculation:**

From Graph-1

- $1/e^2$ of maximum intensity (Current), $I_e = \dots\dots\dots$ mA
- Diameter of the beam corresponds to $I_e, d_1 = \dots\dots\dots$ mm

From Graph-2

- $1/e^2$ of maximum intensity (Current), $I_e = \dots\dots\dots$ mA
- Diameter of the beam corresponds to $I_e, d_2 = \dots\dots\dots$ mm

Divergence angle (θ)

$$\theta = \frac{d_2 - d_1}{z_2 - z_1} = \dots\dots\dots \text{m rad}$$

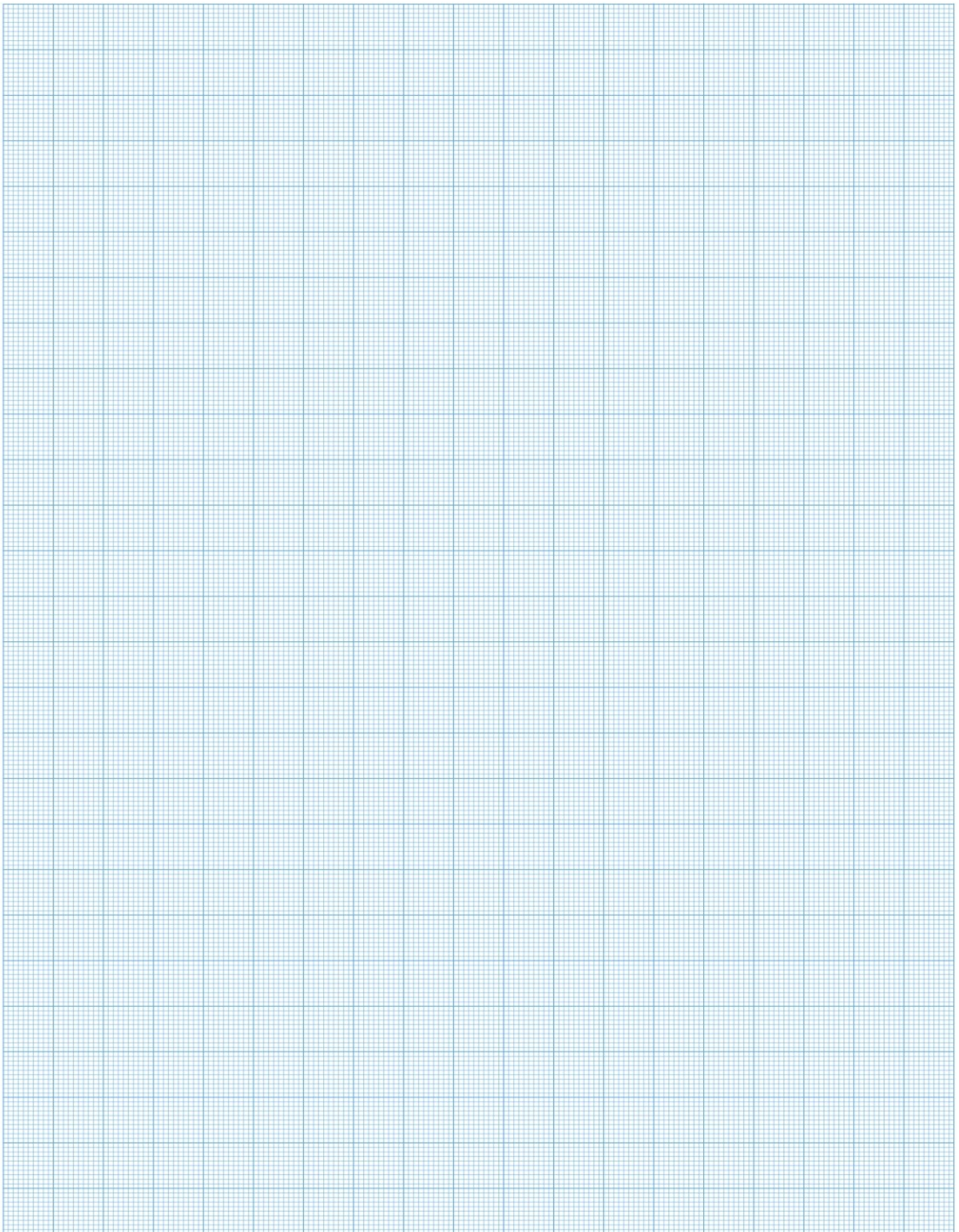
❖ **Result:** Beam divergence of the given laser beam is $\dots\dots\dots$ m rad.

Code	Experiment	Arrangement (5)	Reading (5)	Calculations (5)	Graph (5)	Understanding/ Calculation (10)	viva (10)	Attendance (10)	Total (50)
P_6	LASER DIVERGENCE								

SIGN

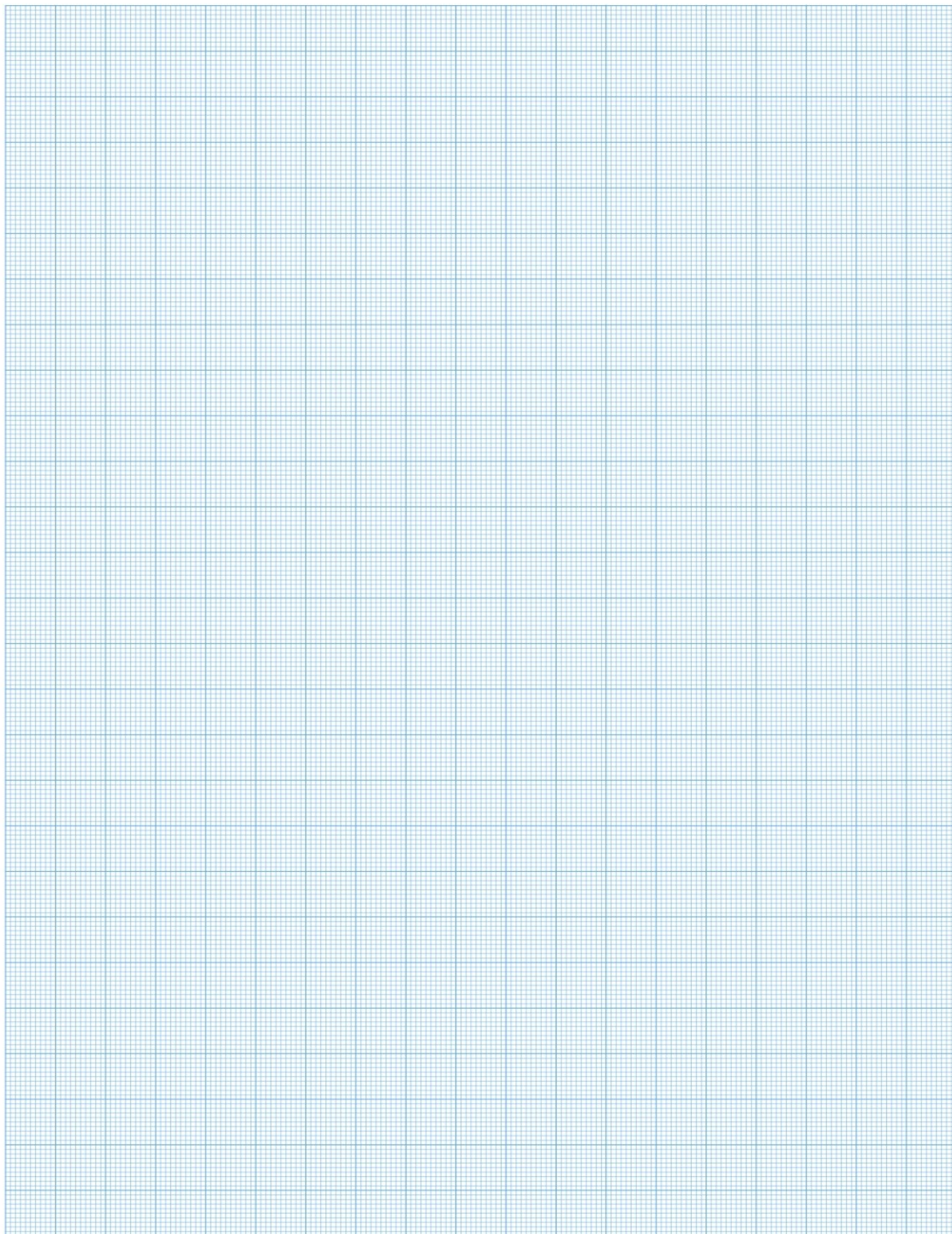
Scale: X-axis: 1 cm =

Y-axis: 1 cm =



Scale: X-axis: 1 cm =

Y-axis: 1 cm =



Physics Laboratory Manual

Experiment-6 [P_6 (VLAB)]

Code	Objective of the experiment	Course Outcome
P_6	To determine the resistivity of semiconductors by Four probe Method.	CO-4

⌘ Website link: <http://vlab.amrita.edu/?sub=1>

❖ **Objective:** To determine the resistivity of semiconductors by Four probe Method.

❖ **Apparatus:** Probe arrangement, sample, oven 0-200°C, constant current generator, Oven power supply and digital panel meter (measuring voltage and current)

❖ **Procedure:**

1. Select the semiconductor material from the combo box.
2. Select the source current from the slider. Restrict the slider based on the range of current.
3. Select the Range of oven from the combo box.
4. Set the temperature from the slider.
5. Click on the Run Button to start heating the oven in a particular interval, from the default 25 °C to the temperature that we set already Click on the Wait button to stop heating.
6. Click on the Set button to display the temperature that we set in the oven.
7. Click on the Measure button to display the present temperature in the oven.
8. Select the range of voltmeter from the combo box.
9. Measure the Voltage using Voltmeter.
10. Calculate the Resistivity of semiconductor.

❖ **Observations:**

- (1) Distance between the probes, $S = 0.2 \text{ cm}$
- (2) Thickness of the sample, $w = 0.05 \text{ cm}$
- (3) From standard table, function $f = 5.89$

❖ **Observation Table:**

Sr. No.	Temperature $T (^{\circ}\text{C})$	Voltage $V (\text{volt})$	Current $I (\text{ampere})$	Resistivity $\rho (\Omega \text{ cm})$
1				
2				
3				
4				
5				

❖ **Calculation:**

➤ $\rho_0 = \frac{V}{I} (2 \pi S) = \dots\dots\dots$

➤ $\rho = \frac{\rho_0}{f} = \dots\dots\dots$

❖ **Result:**

The resistivity of the given semiconductor by Four probe Method = $\Omega \text{ cm}$

Code	Experiment	Arrangement (5)	Reading (10)	Calculations (5)	Graph (0)	Understanding/ Calculation (10)	viva (10)	Attendance (10)	Total (50)
P_6	FOUR PROBE METHOD								

SIGN

Physics Laboratory Manual

Experiment-7 (P_7)

Code	Objective of the experiment	Course Outcome
P_7	Understand the function of CRO and measure the <i>rms</i> voltage and Frequency of AC signal using CRO.	CO-4

❖ **Objective:** Understand the function of CRO and measure the *rms* voltage and Frequency of AC signal using CRO.

❖ **Components:** CRO, Function Generator

❖ **Procedure:**

- Switch on the CRO and Function Generator.
- Study and understand the function of every knob on CRO and function generator.
- Set function generator to any frequency with a particular peak to peak voltage (V_p)
- Connect the output of function generator to any channel of CRO.
- Adjust CRO so that stable and full signal is viewed.
- Measure V_p using formula-(1). Determine V_p & V_{rms} .
- Determine the frequency of the same signal.
- Repeat for different signals.

❖ **Observation Table:**

1. Measurement of AC voltage:

Sr. No.	Signal no.	Division on Y-axis	Volt/div.	V_P	V_{rms}
1	Signal-1				
2	Signal-2				
3	Signal-3				

2. Measurement of AC frequency:

Sr. No.	Signal no.	Division on X-axis	Time/div.	Time Period (T)	Frequency (f)
1	Signal-1				
2	Signal-2				
3	Signal-3				

❖ **Calculation:**

1. Signal-1

➤ Voltage (V_P) = (Division on Y-axis) (volt/division) =

➤ $V_{rms} = 0.707 V_P = \dots\dots\dots$

➤ Time period (T) = (Division on X-axis) (time/division) =

➤ Frequency (f) =

2. Signal-2

- Voltage (V_p) = (Division on Y-axis) (volt/division) =
- $V_{rms} = 0.707 V_p = \dots\dots\dots$
- Time period (T) = (Division on X-axis) (time/division) =
- Frequency (f) =

3. Signal-3

- Voltage (V_p) = (Division on Y-axis) (volt/division) =
- $V_{rms} = 0.707 V_p = \dots\dots\dots$
- Time period (T) = (Division on X-axis) (time/division) =
- Frequency (f) =

❖ Result:

With the help of CRO one can determine the *rms* voltage and frequency of AC signal.

Code	Experiment	Arrangement	Reading	Calculations	Graph	Understanding/ Calculation	viva	Attendance	Total
		(10)	(10)	(5)	(0)	(5)	(10)	(10)	(50)
P_7	CRO								

SIGN

Physics Laboratory Manual

Experiment-8 (P_8)

Code	Objective of the experiment	Course Outcome
P_8	To find zener breakdown voltage.	CO-2

❖ **Objective:** To find zener breakdown voltage.

❖ **Instrument Used:** Diode Characteristics Trainer (NV6501)

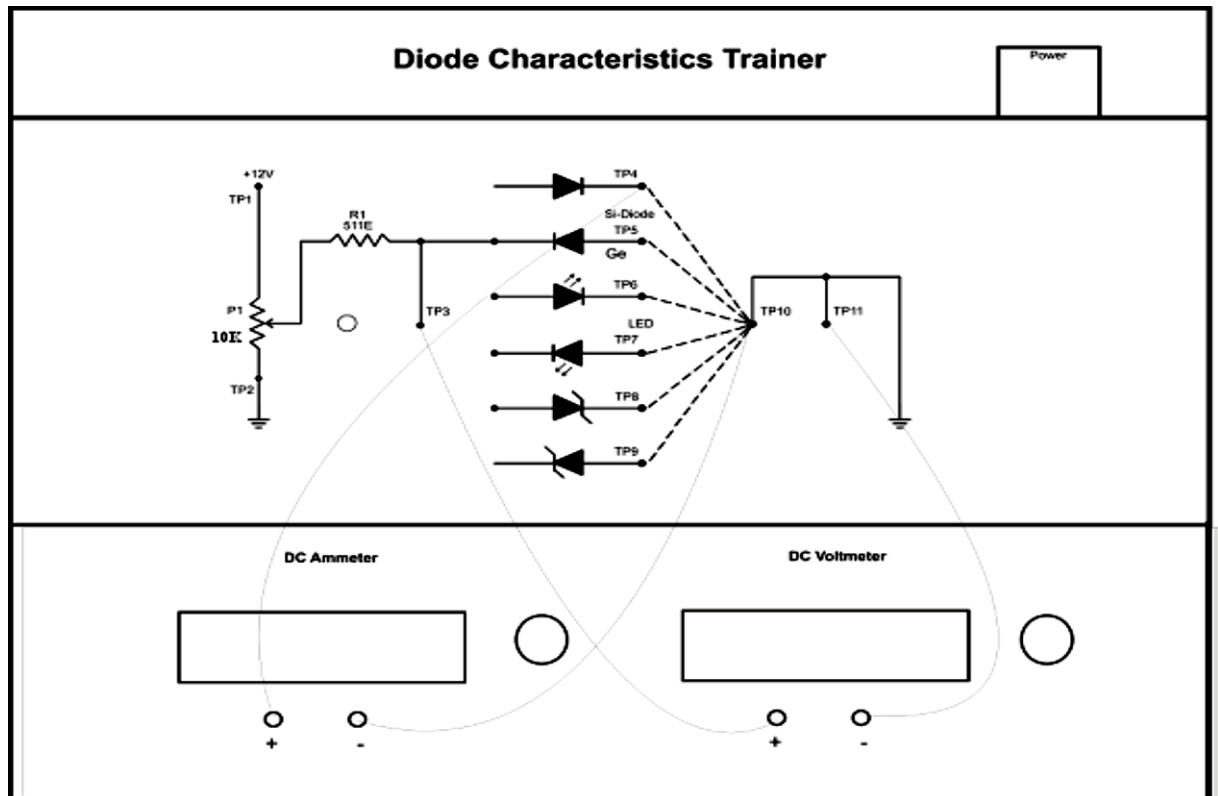
❖ **Items Required:**

1. Zener Diode, Regulated Power Supply
2. Connecting wire

❖ **Procedure:**

1. Before switch 'On' the supply rotate potentiometer P1 fully in CCW (counter clockwise direction).
2. Connect Ammeter between **TP9** and **TP10**, to measure Zener current I_Z (mA) & set Ammeter at **20 mA** range (as shown in fig. 1).
3. Connect Voltmeter across **TP3** and **TP11**, to measure Zener voltage V_Z & set Voltmeter at **20 V** range.
4. Switch 'On' the power supply.
5. Vary the potentiometer P1 so as to increase the value of zener voltage V_Z from 0 to 15 V in steps and measure the corresponding values of zener current I_Z and note down in the Observation Table.
6. Switch 'Off' the supply.
7. Plot a curve between diode voltage V_Z and diode current I_Z using suitable scale, with the help of Observation Table and find breakdown voltage.

❖ Circuit Diagram:



❖ Observation Table:

Sr. No.	Zener Voltage, V_Z (volt)	Zener Current, I_Z (mA)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

❖ **Graph:** I v/s V graph is shown on page no ____.

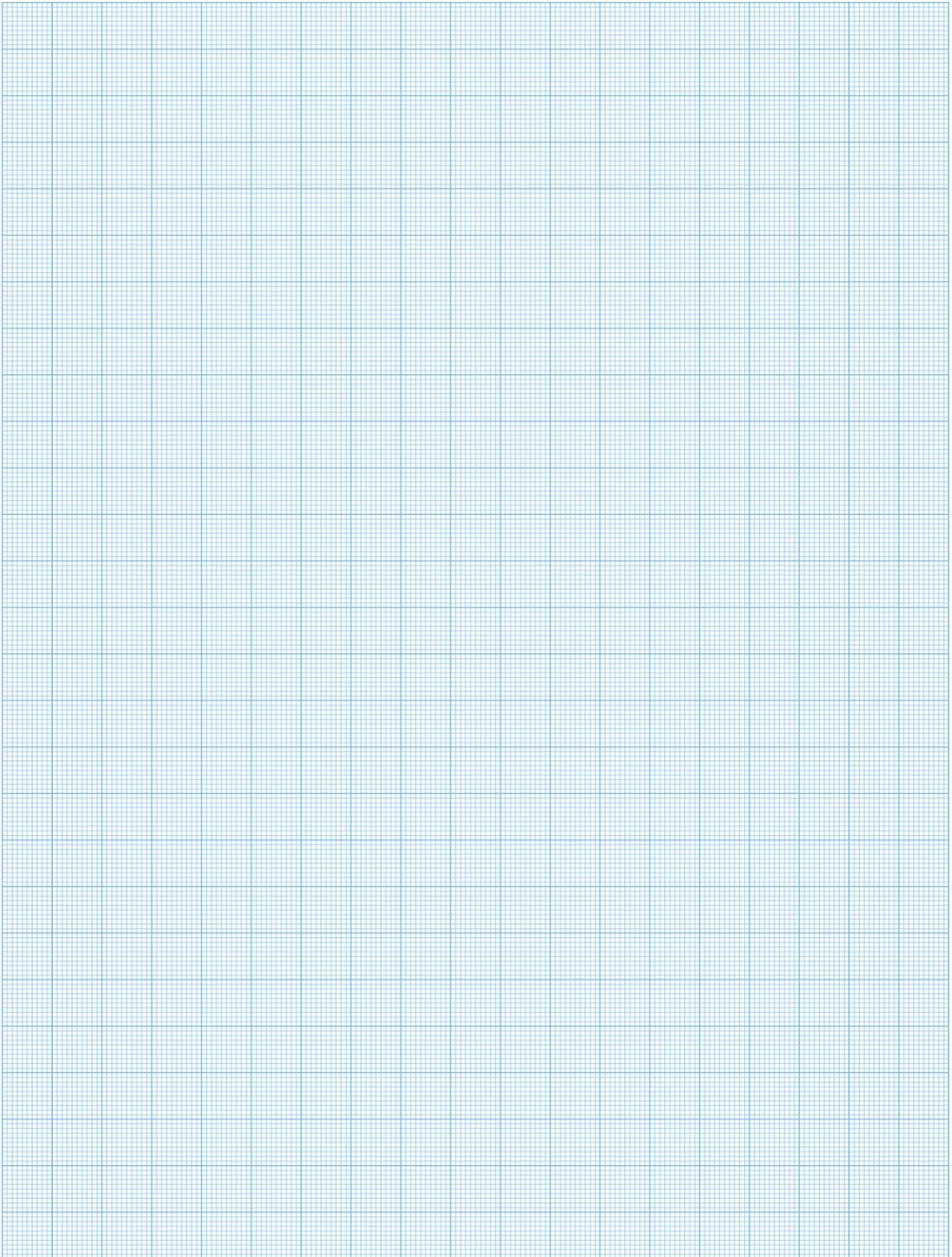
❖ **Result:** Zener Breakdown voltage for given zener diode is volt.

Code	Experiment	Arrangement (10)	Reading (5)	Calculations (5)	Graph (5)	Understanding /Calculation (5)	viva (10)	Attendance (10)	Total (50)
P_8	Zener Diode								

SIGN

Scale: X-axis: 1 cm =

Y-axis: 1 cm =



Physics Laboratory Manual

Experiment-9 [P_9 (VLAB)]

Code	Objective of the experiment	Course Outcome
P_9 (VLAB)	<ol style="list-style-type: none">1. To determine the stopping potential from the graph of photocurrent versus applied potential.2. To determine the Planck's constant from the graph of kinetic energy versus frequency.3. To determine work function of given material.	CO-3

⌘ Website link: <http://vlab.amrita.edu/?sub=1>

❖ **Objectives:**

1. To determine the stopping potential from the graph of photocurrent versus applied potential.
2. To determine the Planck's constant from the graph of kinetic energy versus frequency.
3. To determine work function of given material.

❖ **Apparatus:**

Battery, Rheostat, Voltmeter, Ammeter, Photosensitive metal, Collector, Source of light

❖ **Procedure:**

1. Select the material for studying photoelectric effect.
2. Select area of the material, wavelength, 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 and determine the threshold voltage.
6. Repeat the experiment by varying the wavelength for a particular intensity of incident light and note down stopping potential for each wavelength.

❖ **Observations:**

(1) Photosensitive material =

(2) Area of the plate = cm^2

(3) Intensity of incident light = W/m^2

❖ **Observation Table:**

Sr. No	Wavelength (nm)	Voltage (Volt)	Current (μA)
1			
2			
3			
4			
5			
6			
7			
8			

Sr. No	Wavelength (nm)	Voltage (Volt)	Frequency (Hz)	Kinetic Energy (eV)
1				
2				
3				
4				
5				
6				

❖ **Calculation:**

($e = 1.6 \times 10^{-19} \text{ C}$, $c = 3 \times 10^8 \text{ m/s}$)

- Work function, $\phi = h f_0 = \dots\dots\dots \text{ J}$.
- Work function, $\phi = h f_0 / e = \dots\dots\dots \text{ eV}$.

❖ **Graphs:**

- (1) Photocurrent vs Applied Potential
- (2) Kinetic Energy of electron vs Frequency on incident light

❖ **Result:**

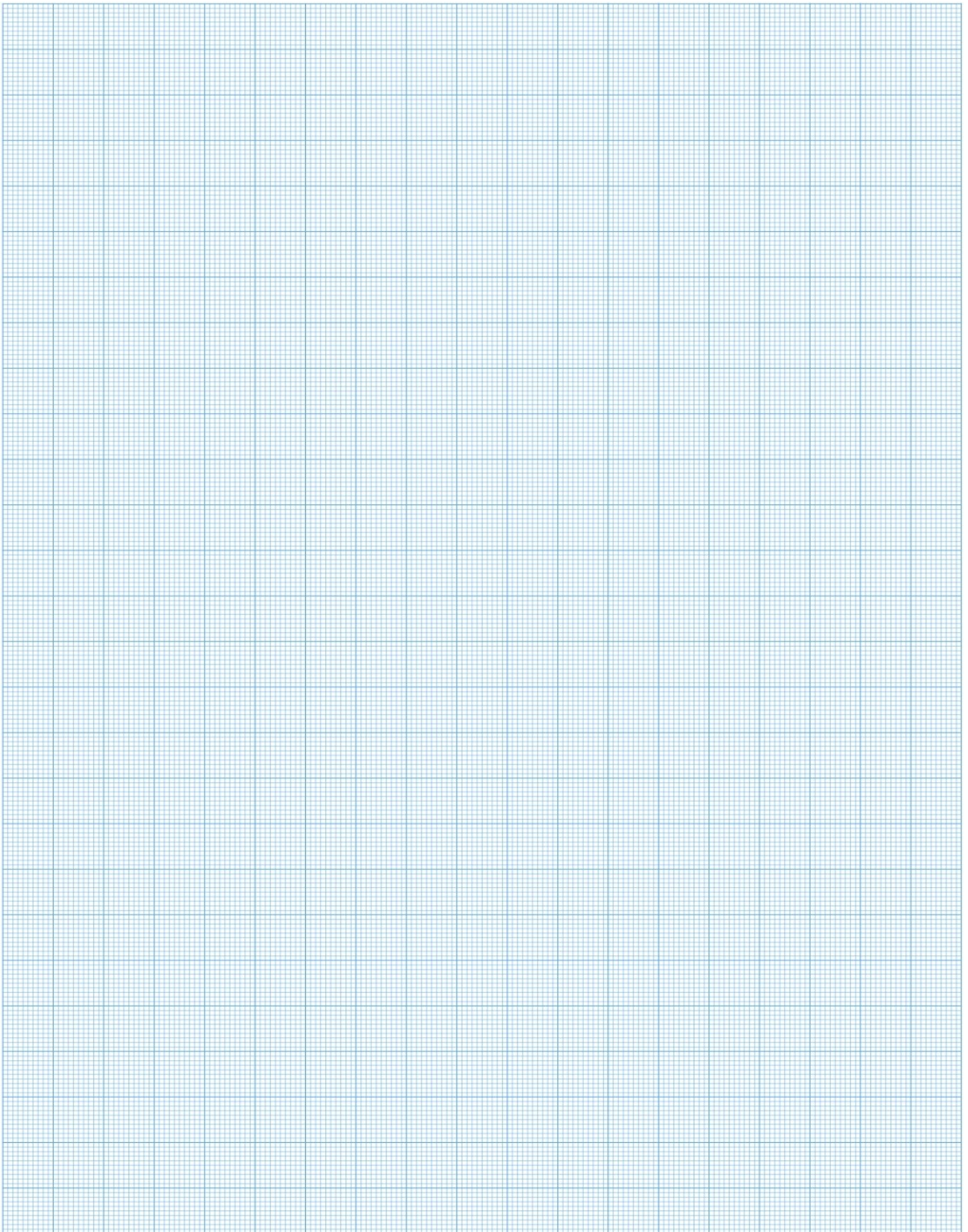
- (1) The value of stopping potential from the current vs voltage graph is $\dots\dots\dots \text{ V}$.
- (2) The value of Plank's constant from the graph of Kinetic Energy vs frequency is $\dots\dots\dots \text{ J s}$.
- (3) The work function of _____ = $\dots\dots\dots \text{ eV}$

Code	Experiment	Arrangement (5)	Reading (5)	Calculations (5)	Graph (10)	Understanding /Calculation (5)	viva (10)	Attendance (10)	Total (50)
P_9	Photoelectric Effect								

SIGN

Scale: X-axis: 1 cm =

Y-axis: 1 cm =



Scale: X-axis: 1 cm =

Y-axis: 1 cm =

