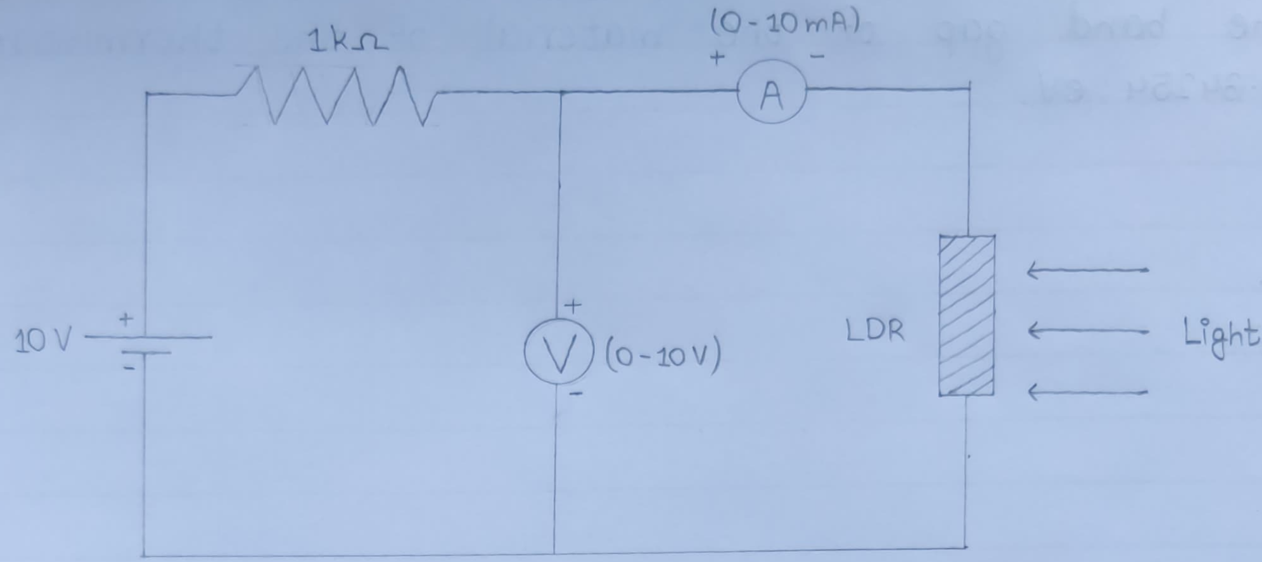
DIAGRAM ⟹



TO DETERMINE THE RESISTANCES OF LDR AT DIFFERENT DISTANCES ⟹

Sr. No.	Distance	Voltmeter Reading	Ammeter Reading	R_R
	cm	(V) volt	(I) mA	kΩ
1.		1	4	0·250
2.		2	6	0·333
3.	A = 15cm	3	10	0·300
4.		4	12	0·333
5.		5	14	0·357
			MEAN ⟹	0·314

1.		1	8	0·125
2.		2	12	0·166
3.	B = 10cm	3	16	0·187

TO STUDY V-I CHARACTERISTICS OF A LIGHT DEPENDENT RESISTOR (LDR).

AIM ⟹

To measure the photoconductive nature and the dark resistance of the given light dependent resistor (LDR) and to plot the characteristics of the LDR.

APPARATUS REQUIRED ⟹

LDR, Resistor (1 kΩ), ammeter (0 - 10 mA), voltmeter (0 - 10V), light source, regulated power, supply.

FORMULA ⟹

By Ohm's law, $V = IR$ or $R = \frac{V}{I}$ ohm

where, 'R' is the resistance of the LDR (i.e.) the resistance when the LDR is closed. 'V' and 'I' represents the corresponding voltage and current respectively.

PRINCIPLE ⟹

The photoconductive device is based on the decrease in the resistance of certain semiconductor materials when they are exposed to both infrared and visible radiation.

The photoconductivity is the result of carrier excitation due to light absorption and the figure of merit depends on the light absorption

4.		4	20	0.200
5.		5	24	0.208
			MEAN $\Longrightarrow$	0.177

1.		1	10	0.100
2.		2	14	0.142
3.	C = 5cm	3	18	0.166
4.		4	23	0.173
5.		5	28	0.178
			MEAN $\Longrightarrow$	0.151

OBSERVATIONS $\Longrightarrow$

1) Voltmeter reading when the LDR is closed = 5V

2) Ammeter reading when the LDR is closed = 14 mA.

3) Dark Resistance (R) $= \frac{V}{I} = \frac{5}{14} = 0.357\,k\Omega$.

CALCULATIONS $\Longrightarrow$

1) $V = 1V$; $I = 4\,mA$

$\therefore R = \frac{V}{I} = \frac{1}{4} = 0.250\,k\Omega$

2) $V = 2V$; $I = 6mA$

$\therefore R = \frac{V}{I} = \frac{2}{6} = 0.333\,k\Omega$

3) $V = 3V$; $I = 10\,mA$

$\therefore R = \frac{V}{I} = \frac{3}{10} = 0.300\,k\Omega$

4) $V = 1V$; $I = 8mA$

$\therefore R = \frac{V}{I} = \frac{1}{8} = 0.125\,k\Omega$

efficiency. The increase in conductivity is due to an increase in the number of mobile charge carriers in the material.

5) $V = 2V \quad ; \quad I = 12 mA$

$\therefore R = \frac{V}{I} = \frac{2}{12} = 0.166 \ k\Omega$

6) $V = 3V \quad ; \quad I = 16 mA$

$\therefore R = \frac{V}{I} = \frac{3}{16} = 0.187 \ k\Omega$

7) $V = 1V \quad ; \quad I = 10 mA$

$\therefore R = \frac{V}{I} = \frac{1}{10} = 0.100 \ k\Omega$

8) $V = 2V \quad ; \quad I = 14 mA$

$\therefore R = \frac{V}{I} = \frac{2}{14} = 0.142 \ k\Omega$

9) $V = 3V \quad ; \quad I = 18 mA$

$\therefore R = \frac{V}{I} = \frac{3}{18} = 0.166 \ k\Omega$

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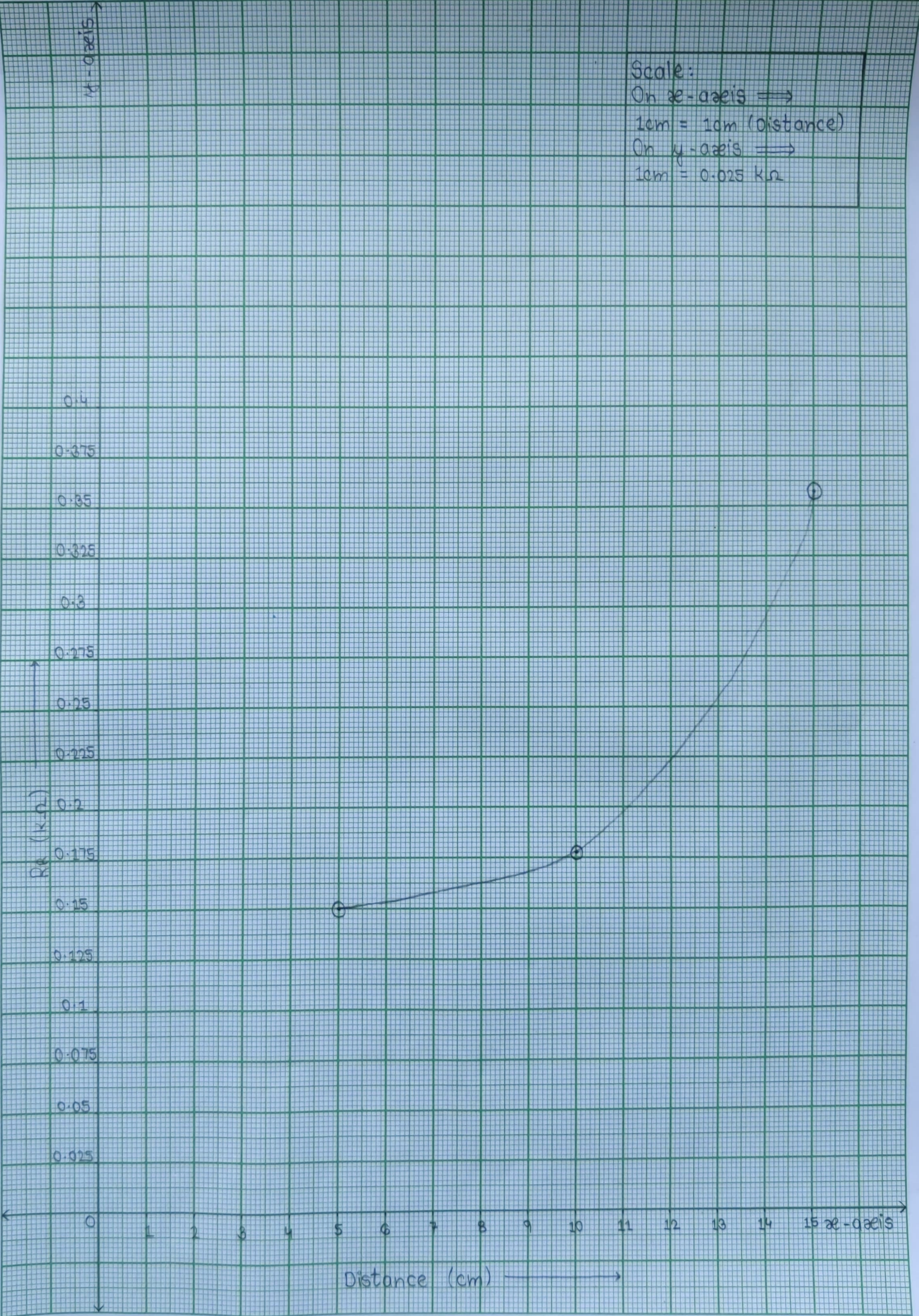
RESULT ⟹

1) The characteristics of LDR were studied and plotted.

2) The dark resistance of the given LDR = 0·357 kΩ.

Teacher's Signature ______



Scale:
On x-axis ⟹
1cm = 1cm (Distance)
On y-axis ⟹
1cm = 0.025 kΩ
y-axis
Rx (kΩ)
0.4
0.375
0.35
0.325
0.3
0.275
0.25
0.225
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
x-axis
Distance (cm)