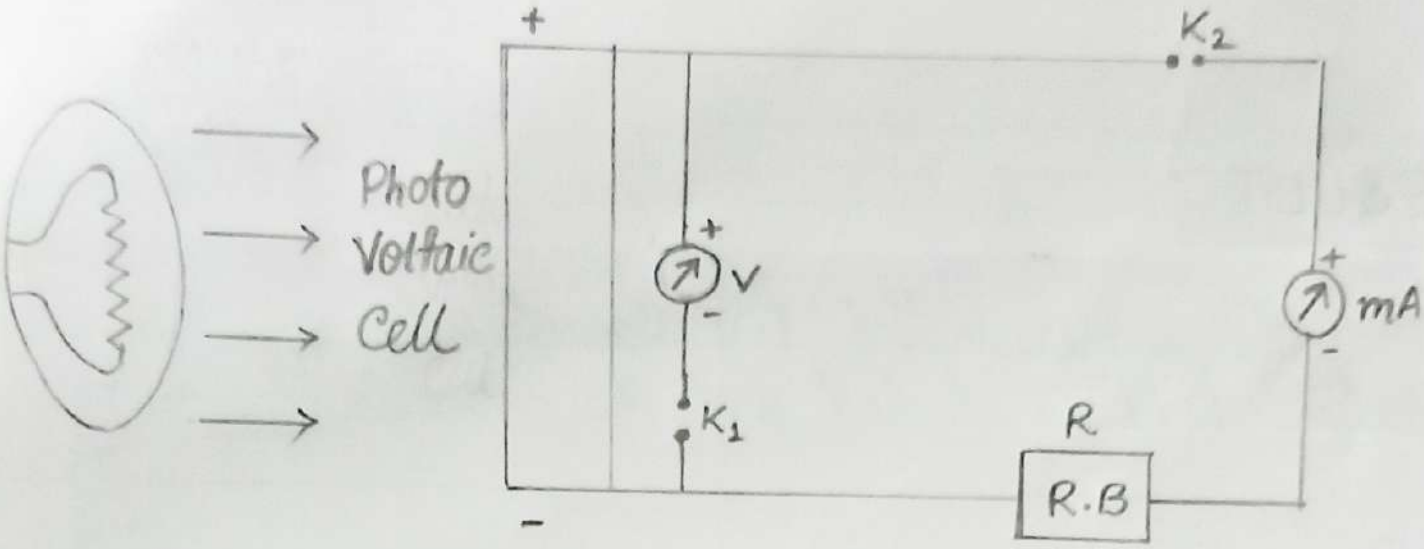
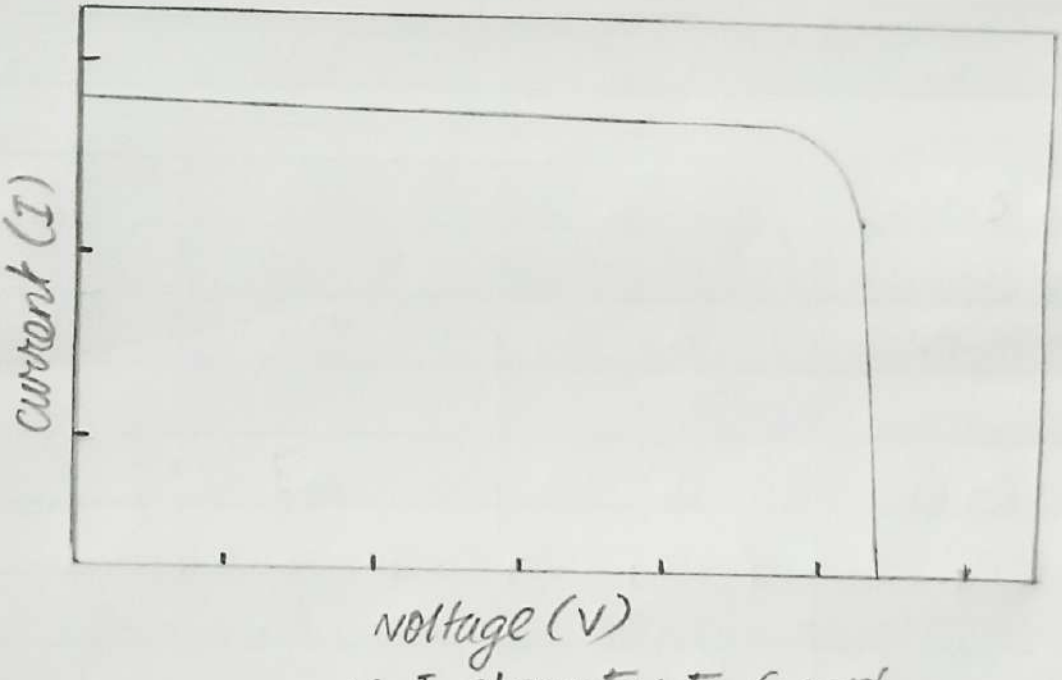
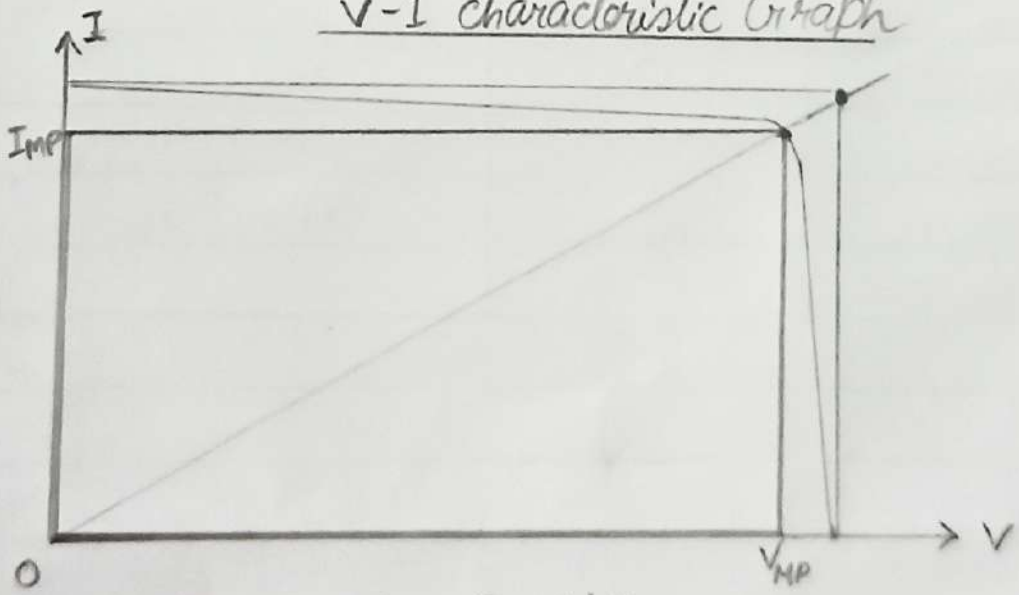


Scematic representation and circuit of Solar Cell



V-I characteristic Graph



Model Graphs

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Determination of Efficiency of a Solar Cell

AIM: To determine the efficiency of solar cell.

APPARATUS:

Solar cell, voltmeter, a dial type resistance box, keys, illuminating lamps, connecting wires etc.

FORMULAE:

Efficiency of solar cell $\eta = [P_{max} / AI_o] \times 100$

P_{max} = Maximum power = $I_{MP} \times V_{MP}$ Watt

A - Area of the solar panel [7.2 cm × 4.5 cm]

I_o - Intensity of light = Power of bulb / $4\pi d^2$

d - Distance between solar panel and bulb.

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OBSERVATION :

Intensity	Resistance (Ohm)	Voltmeter Reading (V)	Ammeter Reading (I) (mA)
	10	1.57	122.6
	22	2.83	122.1
	47	3.62	74.1
	56	3.63	63.3
Maximum	68	3.84	55.2
	82	3.90	45.5
	100	3.93	36.2
	160	3.94	26.2
	180	3.96	21.6

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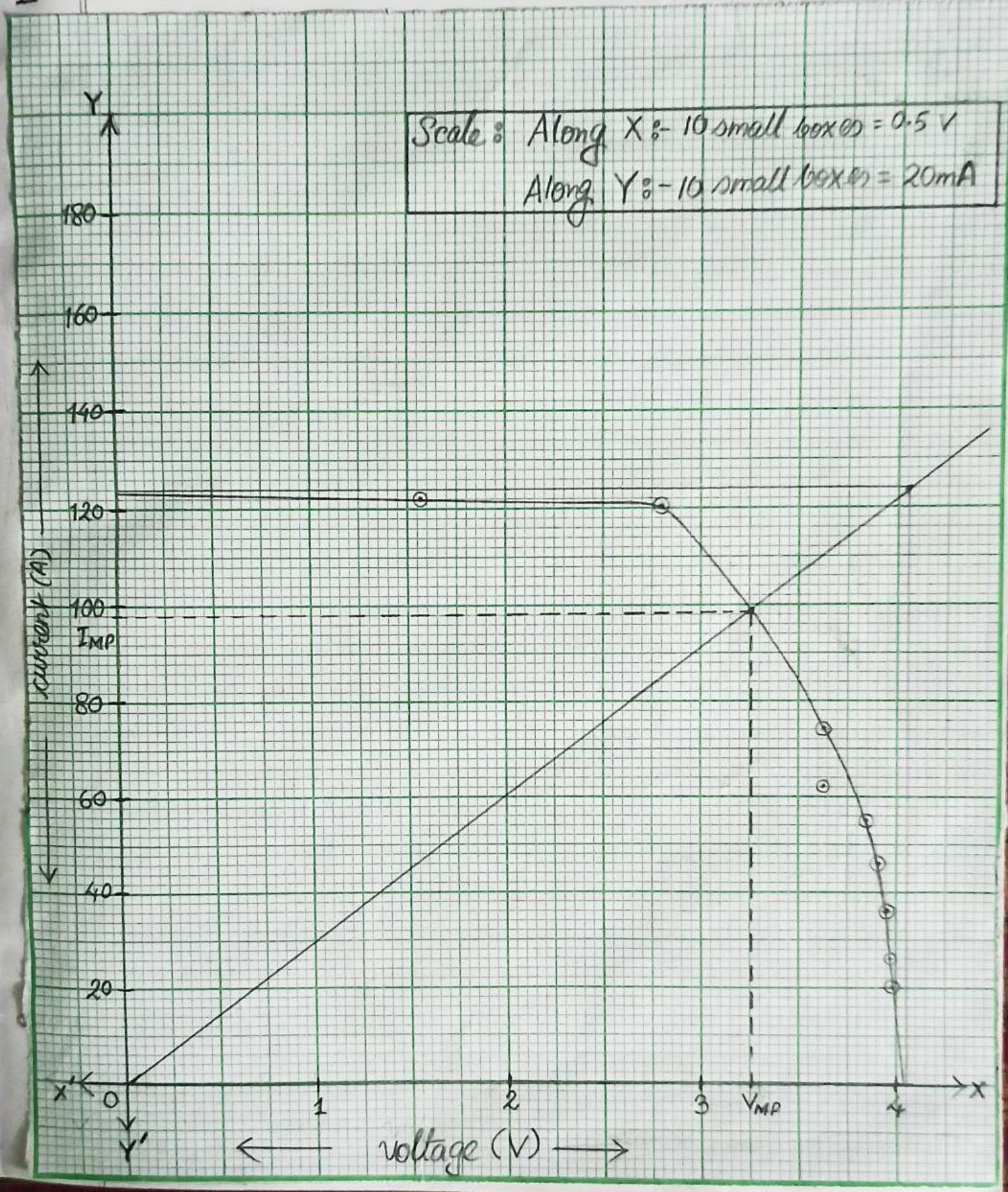

CALCULATIONS :

① Power of the bulb = 75 Watt

② Distance between solar panel and bulb = 10cm
= 0.1 m

③ Maximum Power, $P_{max} = I_{MP} \times V_{MP}$

$= 98 \times 3.25 \times 10^{-3}$

$= 318.5 \times 10^{-3}$ Watt

④ Intensity of Light, I_o = Power of bulb / $4\pi d^2$

$= 75 / (4 \times \pi \times 0.1^2)$

$= 596.83$

⑤ Area of solar panel, A $= (7.2 \times 4.5)\,cm^2$

$= 32.4 \times 10^{-4}\,m^2$

⑥ Efficiency of solar panel (η) = $[P_{max} / A I_o] \times 100$

$= \left(\frac{318.5 \times 10^{-3}}{32.4 \times 10^{-4} \times 596.83} \right) \times 100$

$= 16.471\ \%$

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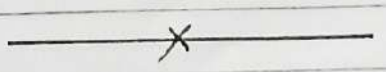
RESULT :

The efficiency of the solar panel is η = 16.47 %



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