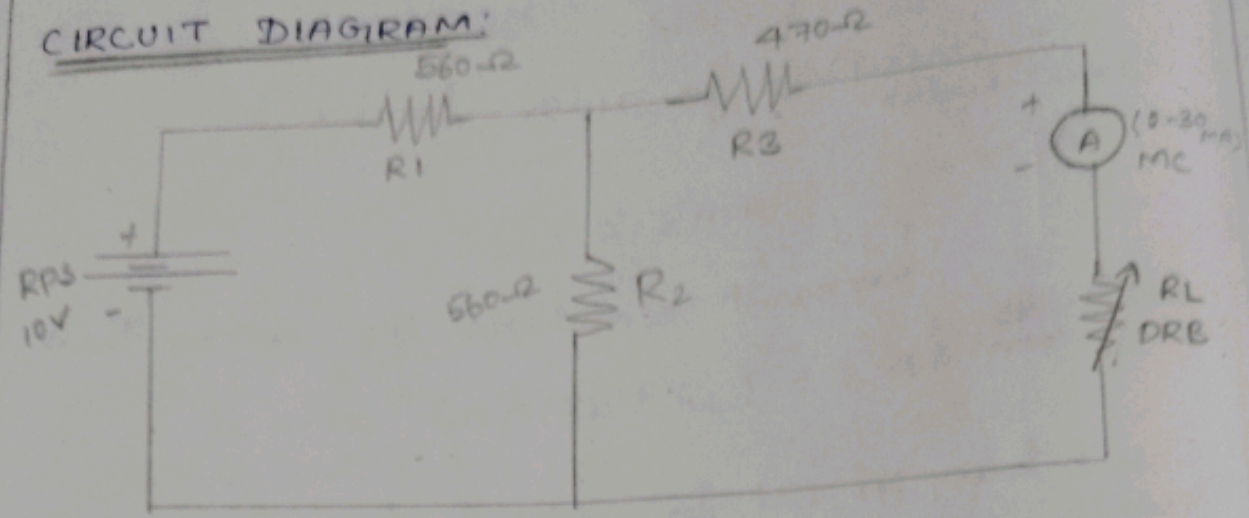
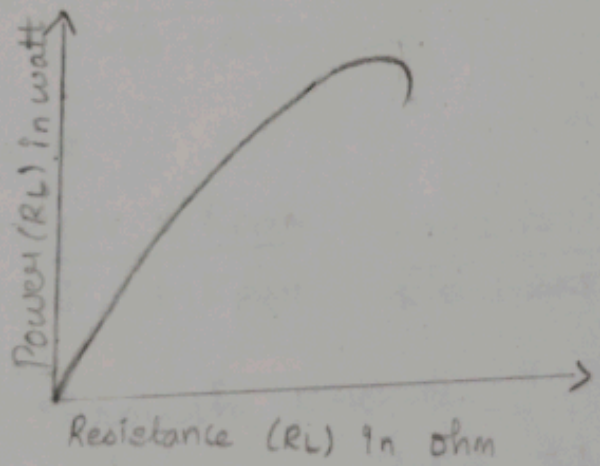
CIRCUIT DIAGRAM:



MODEL GRAPH :



EXP NO: 6 DATE: 26.09.25	VERIFICATION OF MAXIMUM POWER TRANSFER THEOREM

AIM:

To measure the power absorbed in a load and the verify that the power absorbed in a load is maximum only when load resistance is equal to the source resistance.

APPARATUS REQUIRED:

S. NO	NAME OF THE APPARATUS	RANGE/ RATING	QUANTITY
1.	Voltmeter	(0-15V) MC	1
2.	Ammeter	(0-500MA) MC	1
3.	Resistor	560 Ω, 470 Ω	2, 1
4.	RPS (DC supply)	15V	1

PROCEDURE:

1) Make connection as per the circuit diagram.

2) Change the resistors R_L. whose value close to R_{th}, measure the corresponding V_L, I_L and calculate the power P_L and enter into the table (2).

TABLE(2): FOR PRACTICAL CALCULATION

S. NO	Load resistance (RL) In ohm	Load current (IL) In amps	Load voltage (VL) In volts	Load Power (PL) in watts
1.	1K-Ω	2.96 mA	2.96 V	8.76 mW
2.	150 K-Ω	553 mA	0.995 V	5.504 MW
3.	100 K-Ω	6.00 mA	0.6 V	3.6 mW
4.	470 K-Ω	4.13 mA	1.944	8.01 mW
5.	51 Ω	0.85 mA	4.335 V	3.684 mW

CALCULATION:

$$V_{th} = \frac{V \times R_2}{R_1 + R_2} = \frac{10 \times 500}{2(560)} = 5\,V$$

$$R_{th} = \frac{560 \times 560}{2(560)} + 470 = 280 + 470 = 750\,\Omega$$

$$R_L = R_{th}$$

$$R_L = \frac{(V_{th})^2}{4(R_{th})} = \frac{(5)^2}{4 \times 750} = \frac{25}{3000} = 0.083 = 8.33\,mW$$

$$I_L = \frac{V_{th}}{R_{th} \times R_L} = \frac{5}{1500} = 0.0333\,A$$

$$I_L = 3.33\,mA$$

$$V_L = I_L \times R_L = 3.33 \times 10^{-3} \times 750$$

$$V_L = 2.5\,V$$

3. Plot a graph between R_L and P_L and find the R_L corresponding to maximum power transfer.

4. Verify the measured values of R_L at maximum power transfer as same as calculated and found graphically.

RESULT:

Thus Maximum power transfer theorem is verified practically and theoretically.