EXP NO: 06

DATE: 26/9/2025

VERIFICATION OF MAXIMUM POWER TRANSFER THEOREM

AIM:

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

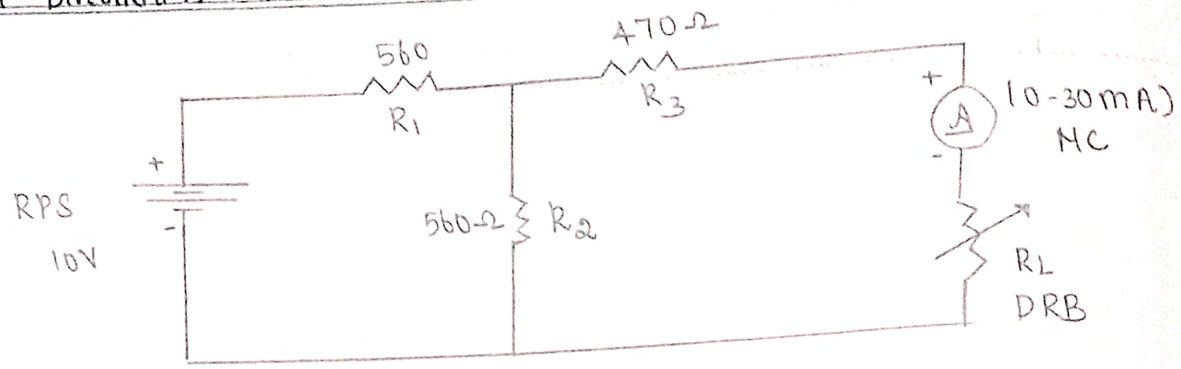
APPARATUS REQUIRED:

S.NO	Name of the Apparatus	Range / Rating	Quantity
1	voltmeter	(0-15V)MC	1
2	Ammeter	(0-500mA)MC	1
3	Resistors	560Ω,	2
		470Ω	1
4	RPS (DC supply)	15V	1

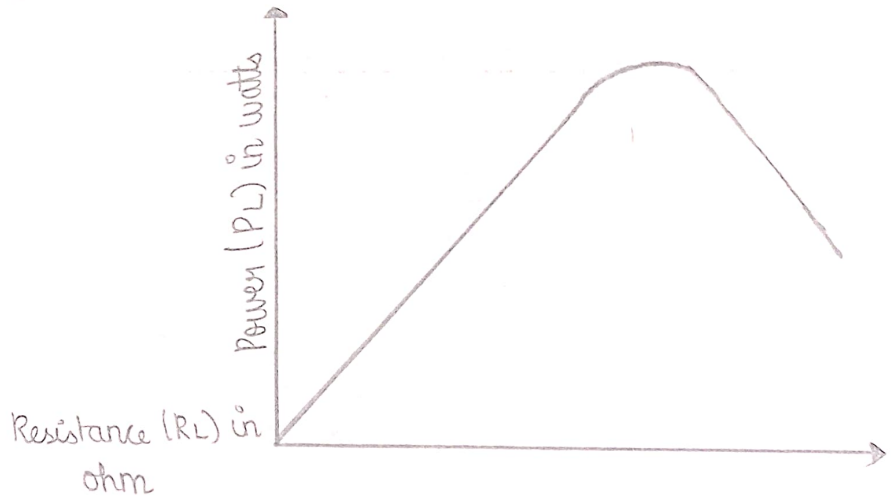
PROCEDURE:

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 P_L and enter into the table (2).
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.

CIRCUIT DIAGRAM: FOR MAXIMUM POWER TRANSFER THEOREM



MODEL GIRAPH:



TABLE(2): FOR PRACTICAL CALCULATION:-

S.NO	Load resistance (RL) in Ω	Load current (IL) in amps	Load voltage (VL) in volts	Load power (PL) in Watts
1	1KΩ	2.96mA	2.96V	8.76mW
2	150KΩ	5.53mA	0.995V	6.60mW
3	100KΩ	6.00mA	0.6V	3.6 mW
4	470KΩ	4.13mA	1.94V	8.01mW
5	5 KΩ	0.85mA	4.335V	3.68mW

CALCULATION:-

$$V_{Th} = \frac{V \times R_2}{R_1 + R_2} = \frac{10 \times 560}{560+560} = 5V$$

$$R_{Th} = \frac{560 \times 560}{2(560)} + 470 = 280 + 470$$

$$= 750\,\Omega$$

$$R_L = R_{Th}$$

$$P_L = \frac{(V_{Th})^2}{4(R_{Th})} = \frac{(5)^2}{4 \times 750} = \frac{25}{4 \times 750} = \frac{25}{3000}$$

$$= 8.33mW$$

$$I_L = \frac{V_{Th}}{R_{Th} + R_L} = \frac{5}{1500} = 0.0033A$$

$$I_L = 3.33mA$$

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

$$V_L = 2.5V$$

RESULT:

The maximum power transfer theorem is verified practically and theoretically.