

Experiment –

Aim : To Verify the Max Power Transfer Theorem.

Apparatus :
1. Voltmeter (0-50V)
2. Ammeter (0-500 mA)
3. Resistance Boxes
4. Power supply (0-15V)

Theory: The Maximum Power Transfer Theorem states that maximum power is delivered from a source to a load when the load resistance is equal to the source resistance.

Current in the circuit is $I = V_S / (R_S + R_L)$

Power delivered to the load R_L is $P = I^2 R_L = (V_S)^2 R_L / (R_S + R_L)^2$

To determine the value of R_L for max. power to be transferred,

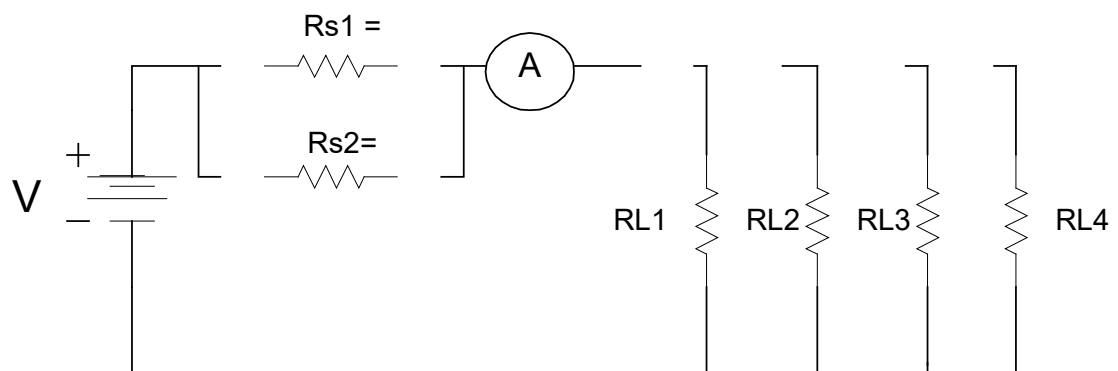
$$\frac{dP}{dR_L} = \frac{d}{dR_L} \left[\frac{(V_S)^2 R_L}{(R_S + R_L)^2} \right] = 0$$

On simplification it gives,

$$R_S = R_L$$

So, maximum power will be transferred to the load when load resistance is equal to the source resistance.

Circuit Diagram:



Procedure:

1. Connect the circuit as shown in fig.(a). using one of the load resistances and note down the reading of ammeter (I) with using 100Ω resistance in series.
2. Repeat the step 1. for various load resistances for source resistance 100Ω and note down the reading of ammeter (I_2).
3. find the source resistance with maximum load current.
4. Tabulate the readings of ammeter.
5. Repeat the above procedure for source resistance 250Ω

Observation:

Sr. No	Source voltage	For Source Resistance	Load resistance (R_L) Ω	R_L Ω	R_L Ω	R_L Ω
1	10V	100 Ω	mA	mA	mA	mA
			watt	watt	watt	watt
2	15V	250 Ω	mA	mA	mA	mA
			watt	watt	watt	watt

Result:

Precautions: