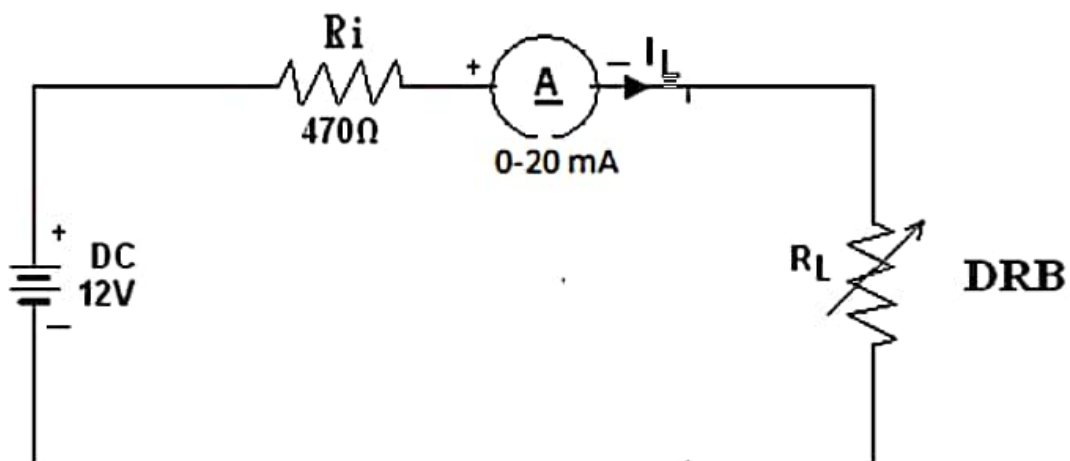# 5. MAXIMUM POWER TRANSFER THEOREM

AIM: To Verify The Maximum Power Transfer Theorem For The Given Circuit.

APPARTUS REQUIRED:

SI. No	Equipment	Range	Qty
1	Bread board	-	1 NO
2	DC Voltage source.	0-30V	1 NO
3	Resistors	470 Ω	1 NO
4	Decade resistance box	0-10k Ω	1 NO
5	Ammeter	0-20mA	1 NO
6	Connecting wires	1.0.Sq.mm	As required

CIRCUIT DIAGRAM:

THEORY:
STATEMENT:
It states that the maximum power is transferred from the source to load when the load resistance is equal to the internal resistance of the source.

<div align="center">(or)</div>

The maximum transformer states that "A load will receive maximum power from a linear bilateral network when its load resistance is exactly equal to the Thevenin's resistance of network, measured looking back into the terminals of network.

Consider a voltage source of V of internal resistance R_i delivering power to a load **Resistance R_L.**

Circuit current $= \dfrac{V}{R_L + R_i}$

Power delivered $P = I^2 R_L$

$\qquad = \left| \dfrac{V}{R_L + R_i} \right|^2 R_L$

for maximum poewer $\dfrac{d(p)}{dt} = 0$

RL+Ri cannot be zero,

$Ri - RL = 0$

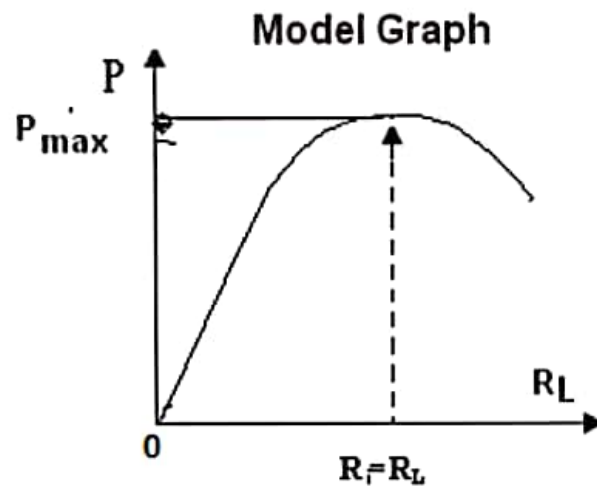$$\boxed{R_L == Ri}$$

$$\mathbf{Pmax} = \dfrac{V^2}{4R_L} \text{ watts}$$

PROCEDURE:
1. Connect the circuit as shown in the above figure.
2. Apply the voltage 12V from RPS.
3. Now vary the load resistance (R_L) in steps and note down the corresponding Ammeter Reading
(I_L) in milli amps and Load Voltage (V_L) volts
6. Tabulate the readings and find the power for different load resistance values.
7. Draw the graph between Power and Load Resistance.
8. After plotting the graph, the Power will be Maximum, when the Load Resistance will be equal to source Resistance
TABULAR COLUMN:

S.No	R_L	I_L(mA)	Power(P max)=I_L^2*R_L(mW)
1			
2			
3			
4			
5			
6			
7			
8			

Model Graph

Theoretical Calculations:-

$R = (R_i + R_L) = \ldots \Omega$

$I_L = V / R = \ldots mA$

$Power = (I_L{}^2) R_L = \ldots mW$

PRECAUTIONS:
1. Initially keep the RPS output voltage knob in zero volt position.
2. Set the ammeter pointer at zero position.
3. Take the readings without parallax error.
4. Avoid loose connections.
5. Avoid short circuit of RPS output terminals.

RESULT:

VIVA QUESTIONS:
1) What is maximum power transfer theorem?
2) What is the application of this theorem?