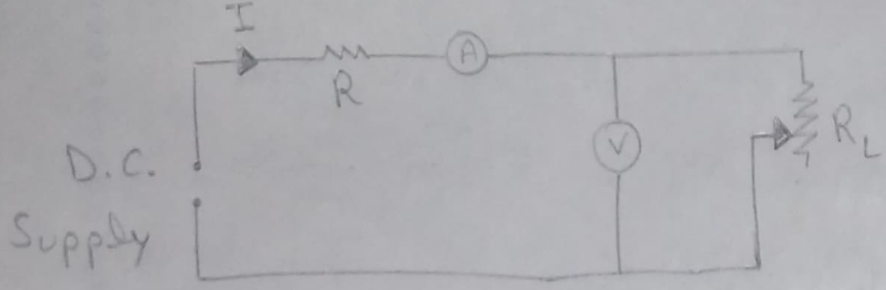
Circuit Diagram :-



Object :- Verification of maximum power transfer theorem.

Apparatus :-

- Voltmeter
- Ammeter
- Load Resistance
- Power Supply (D.C)
- Connecting Leads

Theory :-

It states that the maximum power can be supplied to a load by adjusting the load and linear circuit is shown as thevenin's equivalent circuit.

The Thevenin equivalent is useful in finding the maximum power a linear circuit can deliver to a load. We assume that we can adjust the load resistance if the entire circuit is replaced by its Thevenin equivalent except for the load.

Observation Table :-

V_s (v)	I (mA)	V_L (v)	R_L (kΩ)
4.10	7.6	2.46	0.216
5.70	10.6	3.41	0.330

The load desires maximum power when the load impedance is the conjugate of source impedance, that is if

Z_1 = load impedance

Z_2 = source impedance

then, for maximum transfer of power, $Z_1 = Z_2$

Formula Used :-

$$R_{Th} = \frac{V_{Th}}{I}$$

$$R_{Th} = \frac{V_S - V_L}{I}$$

where,

R_{Th} = Thevenin's equivalent resistance

V_S = Source Voltage

V_L = Load Voltage

I = Total Current

Calculation :-

$$R_{Th} = \frac{V_S - V_L}{I} = \frac{4.10 - 2.46}{7.6 \times 10^{-3}}$$

$$R_{Th} = \frac{1.64}{7.6} \; k\Omega$$

$$R_{Th} = 0.216 \; k\Omega$$

$$R_{Th} = R_L = 0.216 \; k\Omega$$

Hence Verified

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Procedure :-

1. Make circuit connection as shown in the circuit diagram.
2. Starting with a low value resistance note down the readings of voltmeter and ammeter.
3. Increase the value of load resistance.
4. Find the point where power is maximum.
5. Calculate the load resistance for each reading and find the maximum power at which load resistance will be equal to known resistance.
6. Plot the graph of power against load resistance.

Result :- By observing the calculation its verified that thevenin's equivalent resistance is equal to load resistance for maximum transfer of power.