Lab-7 CSE 209

Pre Lab Report DC Circuit

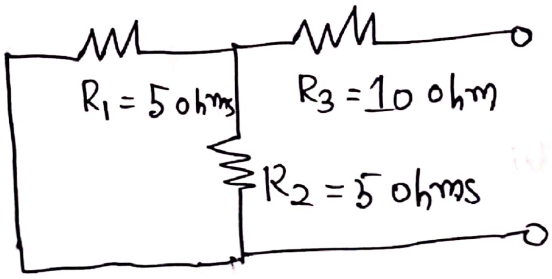
$R_L = R_{Th}$ (Maximum Power)

then product of I_L and V_L will be maximum

$$P_{max} = I_L \times V_L$$

$$= \frac{V_{th}^2}{4R_{Th}}$$

when we calculate R_{Th} then we disconnect the Load and turn off all the independent sources.



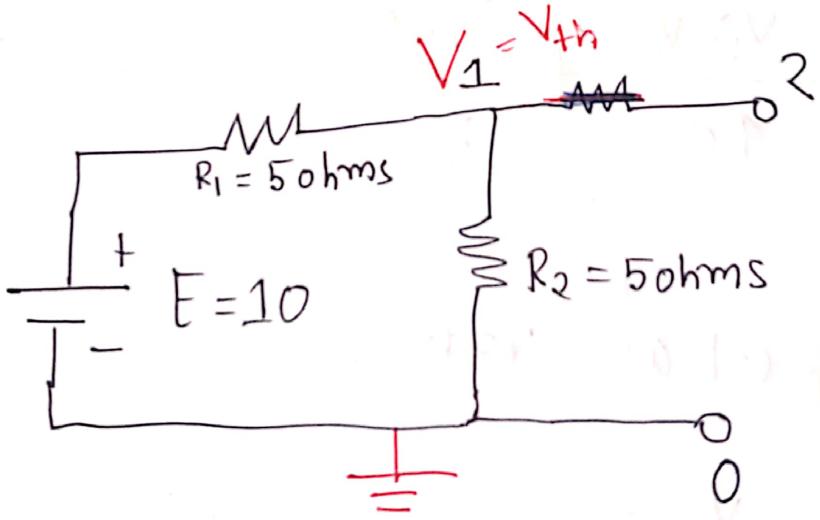
← $R_{eq} = R_{Th}$

$$R_{Th} = [5 \| 5] + 10\ \Omega$$

$$= (2.5 + 10)\ \Omega$$

$$= 12.5\Omega$$

Here R_3 Resistor is floating



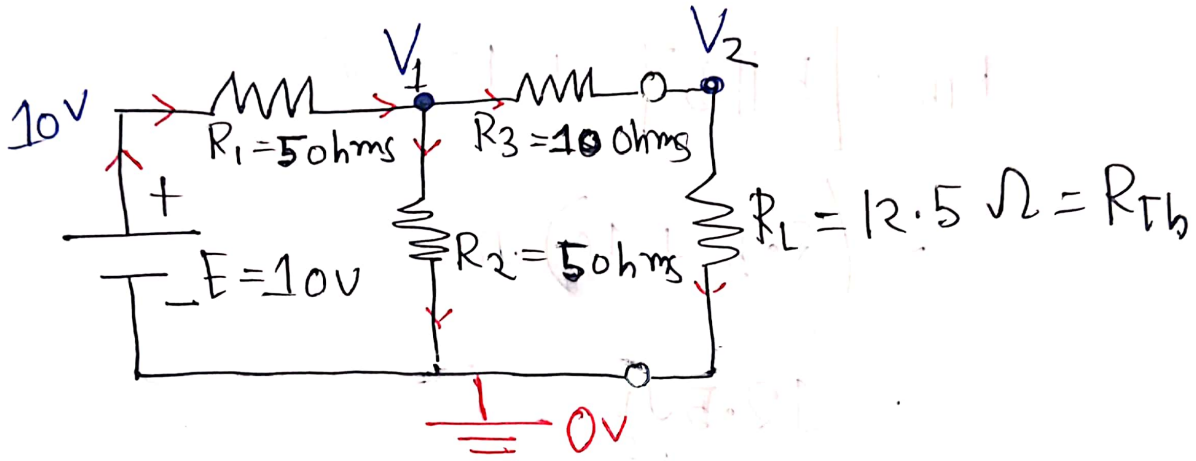
$$V_{Th} = V_{2,0} = V_1 = 5\ V \quad \therefore$$

Using VDR

$$V_1 = \frac{5 \times 10}{5+5} = \frac{\cancel{50}^{5}}{\cancel{10}} = 5\ V$$

$$P_{max} = \frac{5^2}{4 * 12.5}$$

$$= 0.5 \text{ W}$$



Applying KCL at node 1

$$\frac{10 - V_1}{5} = \frac{V_1 - V_2}{10} + \frac{V_1 - 0}{5} \quad \text{——— (I)}$$

Applying KCL at node 2

$$\frac{V_1 - V_2}{10} = \frac{V_2 - 0}{12.5} \quad \text{——— (II)}$$

Solving equation (1) and (2) we get

$$V_1 = \frac{9}{2} V = 4.5\ V$$

$$V_2 = \frac{5}{2} V = 2.5\ V$$

$$I(R3) = \frac{V_1 - V_2}{10}$$

$$= \frac{4.5 - 2.5}{10}$$

$$= \frac{2}{10}$$

$$= \frac{1}{5}\ \Omega$$

or,

$$I(R_3) = \frac{V_2}{12.5}$$

$$= \frac{2.5}{12.5}$$

$$= \frac{1}{5}\ \Omega$$