Pre Lab Report   DC Circuit

$R_L = R_{Th}$ $\left(\begin{array}{l}\text{Maximum} \\ \quad\text{Power}\end{array}\right)$
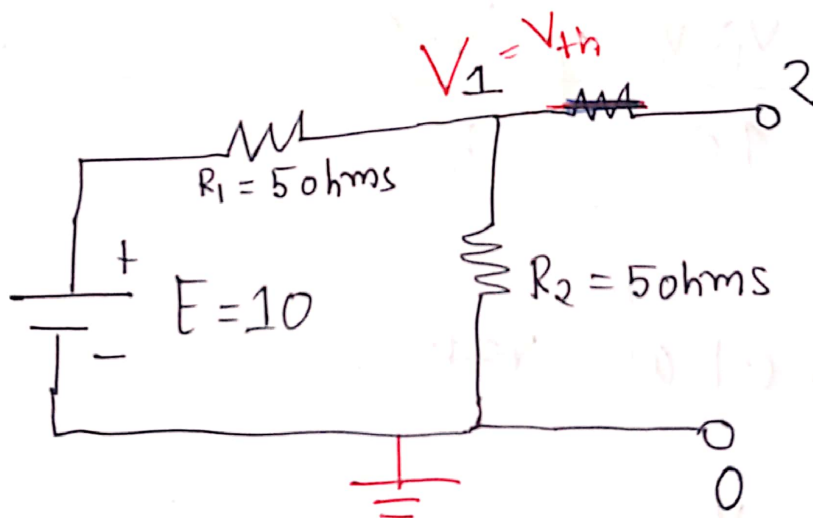
then product of

I_L and V_L will be

maximum

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

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

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

$$R_{Th} = \left[5 \parallel 5 \right] + 10 \ \Omega$$

$$= \left(2.5 + 10 \right) \Omega$$
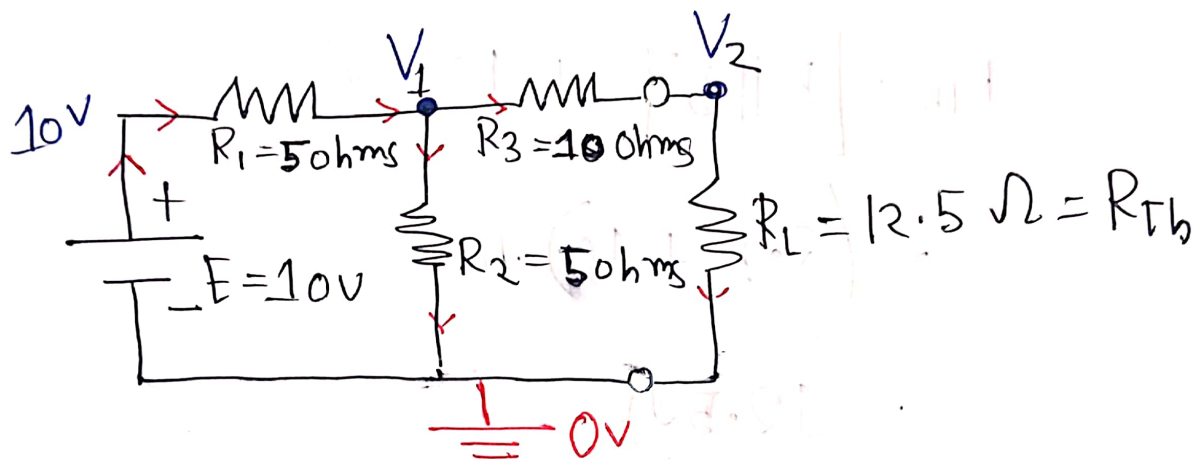
$$= 12.5 \Omega$$
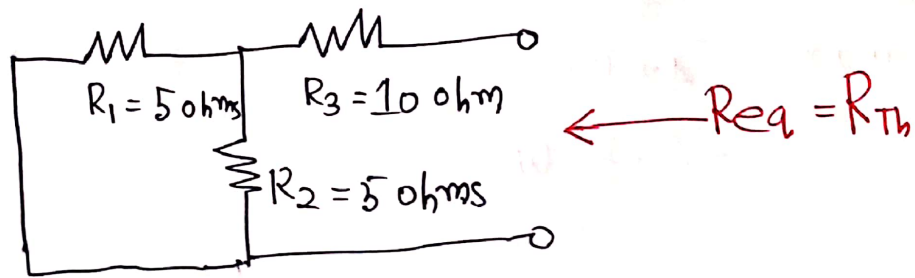
Here R₃ Resistor is floating

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

using VDR

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

$$P_{max} = \frac{5^2}{4 * 12.5}$$
$$= 0.5 \, w$$

Applying KCL at node 1

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

Applying KCL at node 2

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

Solving eaution (1) and (2) we get

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

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

$$I(R_3) = \frac{V_1 - V_2}{10}$$

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

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

$$= \frac{1}{5} \, A$$

or,

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

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

$$= \frac{1}{5} \, A$$