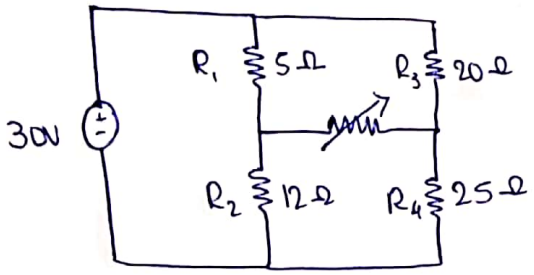
Rashmi.K
4AL18EC043

Circuit challenge [simulation]

Max power transfer -



Disconnect the load resistance from the load load terminal a & b to represent the given crt as the Thevenin's equivalent We have to determine V_{eq} & R_{in}.

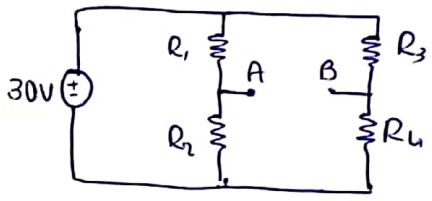
The voltage across terminal AB

in $V_{AB} = V_A - V_B$

$$V_A = V \times \frac{R_2}{R_1+R_2} = 30 \times \frac{20}{5+12} = 2.17V$$

$$V_B = V \times \frac{R_4}{R_3+R_4} = 30 \times \frac{25}{20+25} = 16.66V$$

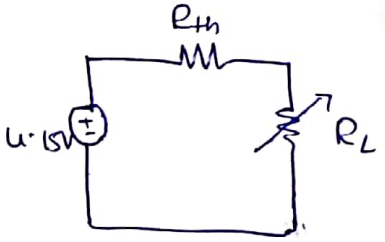
$$V_{TH} = V_{AB} = V_A - V_B = 4.187V$$



To calculate R_{th} : By replacing source with their internal resistance

$$R_{th} = R_{AB} = \left[\frac{R_1 R_2}{R_1+R_2}\right] + \left[\frac{R_3 R_4}{R_3+R_4}\right]$$

$$= 14.164\Omega$$



where $R_L = R_{th}$

And the max power transmitted to load RC is

$$P_{max} = V_{TH}^2 / 4R_{TH}$$

$$= \frac{(4.51)^2}{4 \times 14.64}$$

$$= 343.3mW //$$