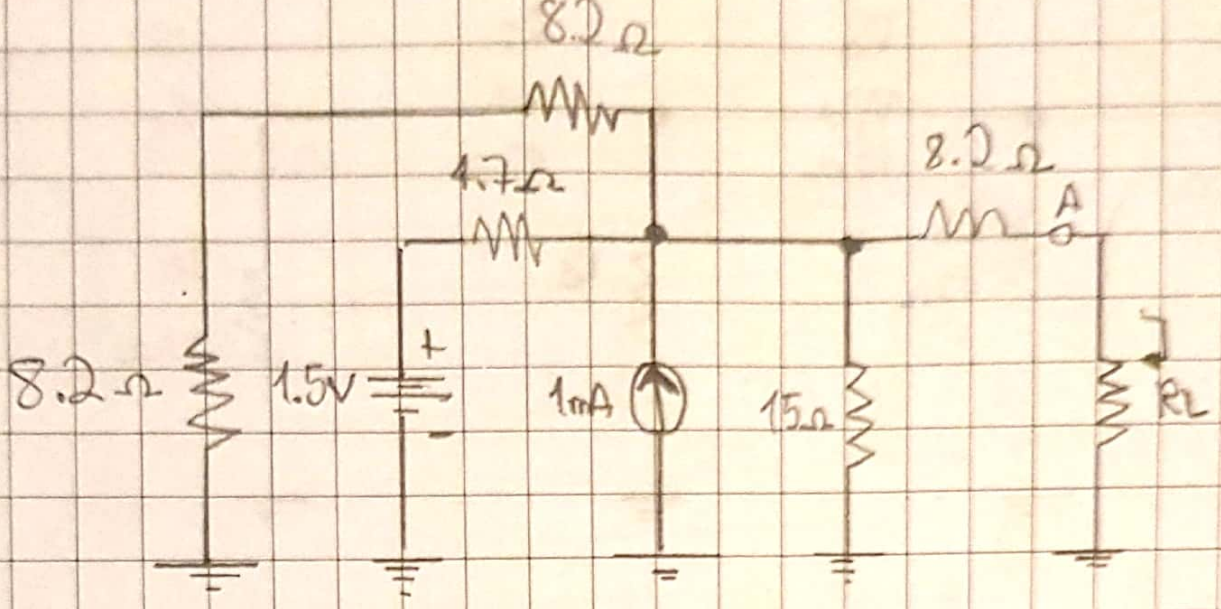
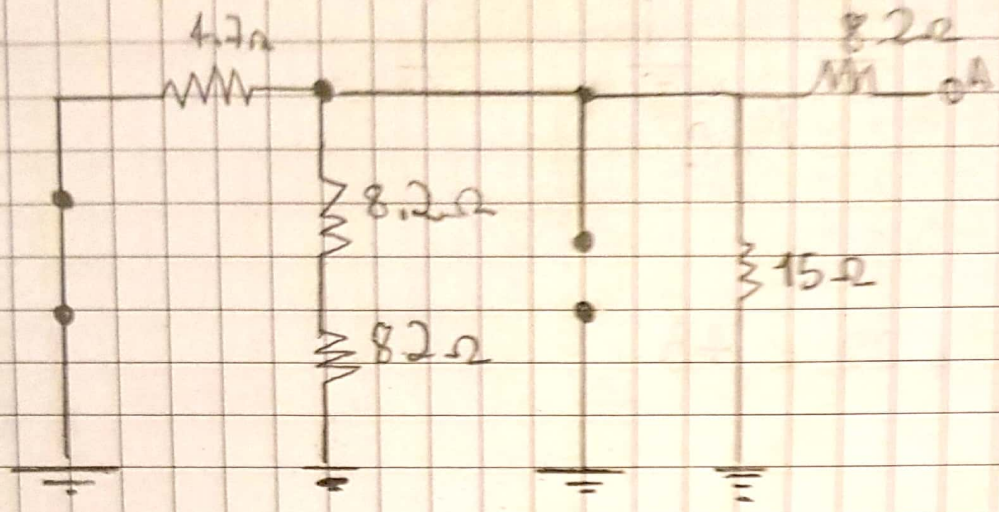
31 En el circuito de la figura 8-86, determine el valor de $R_L$ para transferencia de potencia máxima.

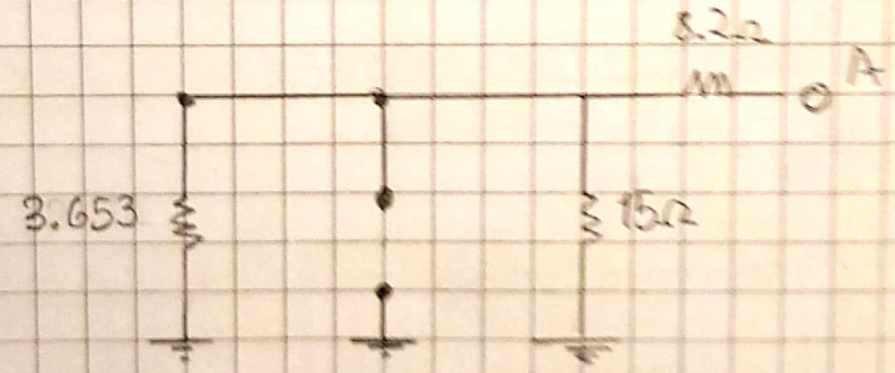
Teorema de transferencia de potencia máxima.




Teorema de Thevenin



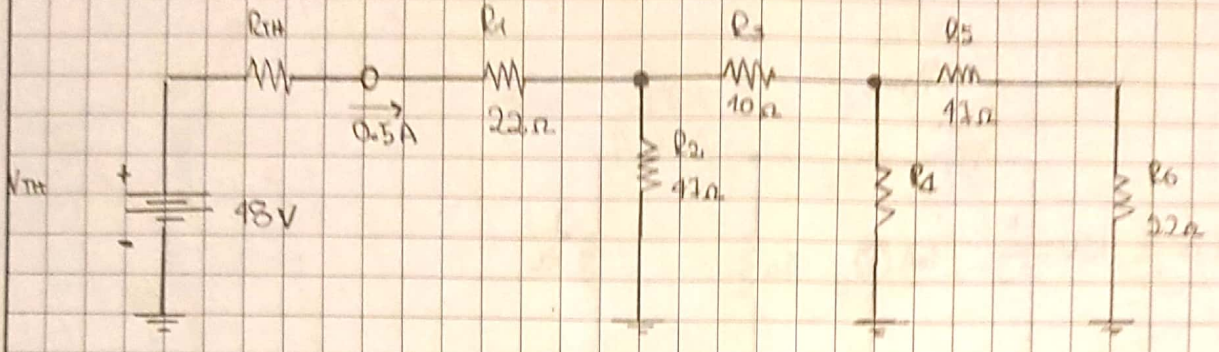

$$R_{TH} = \frac{4.7 \cdot (8.2+8.2)}{4.7 + (8.2+8.2)} = 3.65308$$

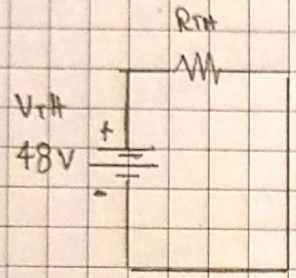



$$R_{TH} = \frac{(3.653)(15)}{(3.653)+(15)} = 2.93766\Omega \approx 2.94\Omega$$

$$\boxed{R_L = 2.94\Omega + 8.2\Omega = 11.13\Omega}$$

(33) ¿Cuáles son los valores de $R_4$ y $R_{TH}$ cuando la potencia máxima se transfiere de la fuente thevenizada a la red en configuración de escalera de la figura 8-87?




$R_{TH} = R_{LADDER}$

$\frac{V_{TH}}{2}$

$$R_{TH} = \frac{24V}{0.5A} = 48\Omega$$

$$R_A = 22\Omega + 47\Omega$$

$$\frac{\left(\frac{69 \cdot R_4}{69 + R_4} + 10\right)47}{47 + \frac{69 \cdot R_4}{69 + R_4} + 10} + 22 = 48$$

$$\frac{\left(\frac{69 \cdot R_4}{69 + R_4} + 10\right)47}{47 + \frac{69 \cdot R_4}{69 + R_4} + 10} = 26$$

$$\frac{69R_4}{69 + R_4} + 10 = \frac{26}{47}\left(\frac{69R_4}{69 + R_4} + 57\right)$$

$$\frac{69R_4}{69 + R_4}\left(1 - \frac{26}{47}\right) = \left(\frac{26}{47}\right)57 - 10 = 21.53$$

$$69R_4 = 69(48.17) + 48.17R_4$$

$$R_4(69 - 48.17) = 69(48.17)$$

$$R_4 = \frac{69(48.17)}{69 - 48.17}$$

$$\boxed{R_4 = 160\Omega}$$

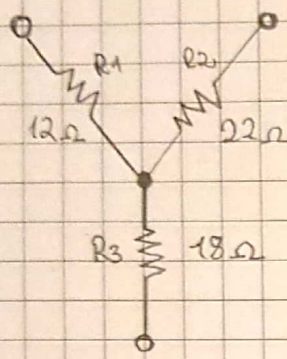
Sección 8-8

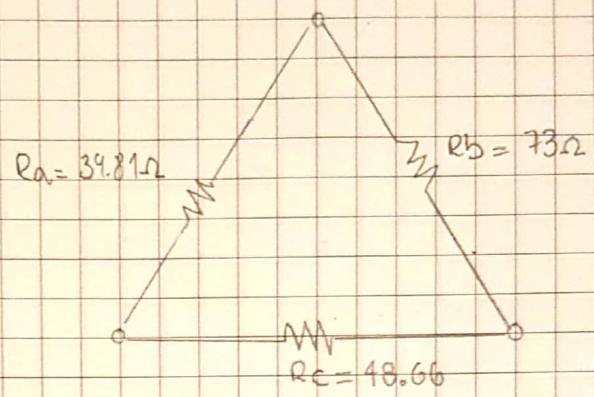
Conversiones delta a Y (ΔaY) y Ya Δ

35. En la figura 8-89, convierta cada red Y en una red delta

figura 8-89

a)



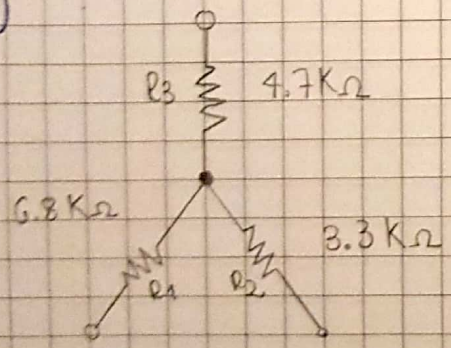



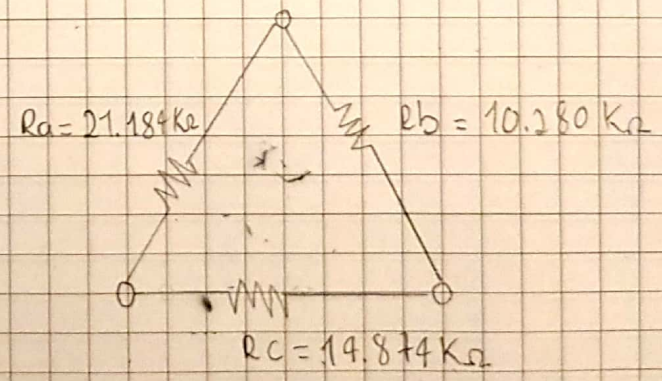

$$Rb = \frac{(12\Omega)(22\Omega)+(22\Omega)(18\Omega)+(18\Omega)(12\Omega)}{12\Omega} = 73\Omega$$

$$Ra = \frac{(12\Omega)(22\Omega)+(22\Omega)(18\Omega)+(18\Omega)(12\Omega)}{22\Omega} = 39.81\Omega$$

$$Rc = \frac{(12\Omega)(22\Omega)+(22\Omega)(18\Omega)+(18\Omega)(12\Omega)}{18\Omega} = 48.66\Omega$$

b)




$$Ra = \frac{(6.8K\Omega)(3.3K\Omega)+(3.3K\Omega)(4.7K\Omega)+(4.7K\Omega)(6.8K\Omega)}{3.3K\Omega} = 21.184K\Omega$$

$$Rb = \frac{(6.8K\Omega)(3.3K\Omega)+(3.3K\Omega)(4.7K\Omega)+(4.7K\Omega)(6.8K\Omega)}{6.8K\Omega} = 10.280K\Omega$$

$$Rc = \frac{(6.8K\Omega)(3.3K\Omega)+(3.3K\Omega)(4.7K\Omega)+(4.7K\Omega)(6.8K\Omega)}{4.7K\Omega} = 14.874K\Omega$$