

### MAXIMUM POWER TRANSFER THEOREM :

$$I = \frac{V}{R_L + R_{TH}} \quad \text{Power is maximum, when slope is zero.}$$

$$P = I^2 R = \left( \frac{V}{R_L + R_{TH}} \right)^2 R_L = V^2 \left( \frac{1}{(R_L + R_{TH})^2} \right) R_L$$

$$\frac{dP}{dR_L} = V^2 \left[ \frac{(R_L + R_{TH})^2 (1) - R_L 2(R_L + R_{TH})}{(R_L + R_{TH})^4} \right] = 0$$

$$= V^2 \left[ \frac{\frac{1}{(R_L + R_{TH})^2} - 2R_L}{(R_L + R_{TH})^3} \right] = 0$$

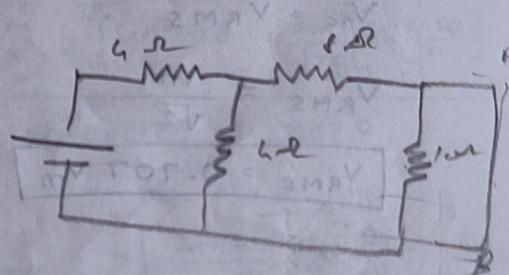
$$\frac{1}{(R_L + R_{TH})^2} = \frac{2R_L}{(R_L + R_{TH})^3}$$

Operation of type II  
is required.

$$2R_L = R_L + R_{TH}$$

$$2R_L - R_L = R_{TH}$$

$R_L = R_{TH}$



$$20 - 4i_1 - 4(i_1 - i_2) = 0$$

~~$$-8i_2 + 10i_3 - 4(i_2 - i_3) = 0$$~~

~~$$-8i_2 - 10(i_2 - i_3) - 4(i_2 - i_3) = 0$$~~

~~$$-10(i_2 - i_3)$$~~

Operation and structure of transmission line with AI  
and Z<sub>ML</sub> V to be find.