

**Birzeit University**

**Faculty of Engineering & Techonology**

**Department of Electrical & Computer Engineering**

**ENEE**

**“Prelab Exp#7”**

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1. Rth=Rint , Vdc=Vth

P = I2 \* RL = ($\frac{Vth}{Rl+Rth}$)2 \* RL

To find maximum power transfer, take the partial derivative with respect to RL:-

$$\frac{dp}{dRL}=\frac{Vtn^{2}\left[(\left(Rth+RL\right)^{2}-2RL\left(RL+Rth\right)\right)}{\left(Rth+RL\right)^{4}}$$

P is maximized when derivative =0 .

$$\left(Rth+RL\right)^{2}=2RL\left(RL+Rth\right)$$

**So RL=Rth**

Rl = 30 ohm

Pmax = ($\frac{Vdc}{Rl+Rint}$)2 \* RL = ($\frac{5}{30+30}$)2 \* 30 = 0.208 W

2.to find max power, let’s find Rth ,Vth.

Rth={[(1.2k//2.2k)+390]//820 }+680$ ≅1161ohm$

Vth, open the RL .

I=15/Req , Req=1980.4ohm

Itotal= 7.5mA

Current divider

I(through 820ohm)=2200\*7.5m/(390+2200+820) = 4.88mA

Vth=820\*5.5m=4V

Pmax=Vth^2 /(4\*Rth) = 3.456mWatt



The max cursor point refers to (1.161k,3.4550m).



4.

1 and 2



3-Pf=Cos ($θv-θi)$

Qc=-Qi …..total reactive power absorbed must equal zero since pf is unity .

X=$ωL=-\frac{1}{ωc}=-125.664ohm$

C$=-\frac{1}{ωX}=6.33uF$