

Basic Elec. Engr. Lab

ECS 204

Asst. Prof. Dr. Prapun Suksompong

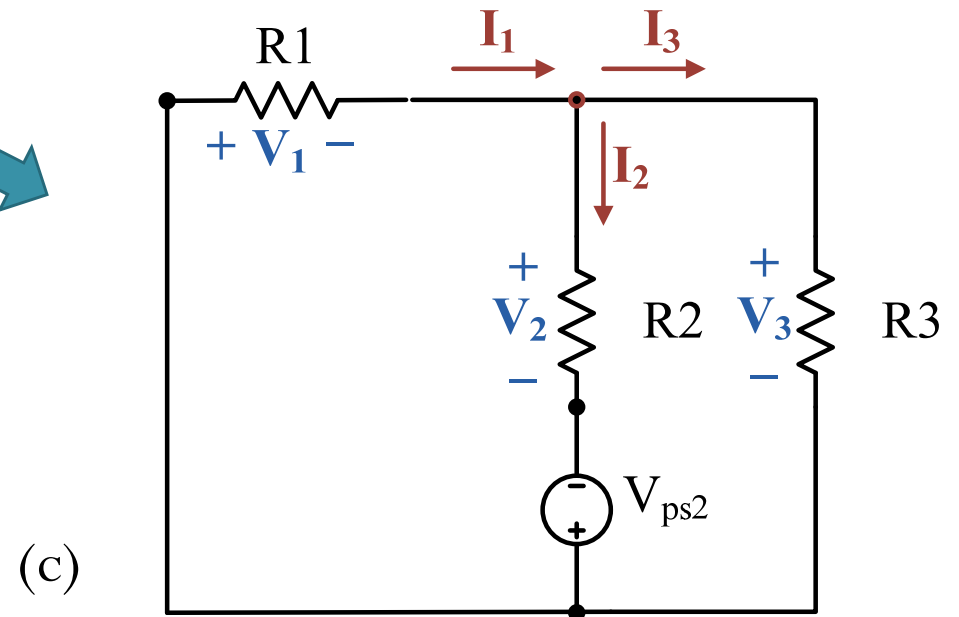
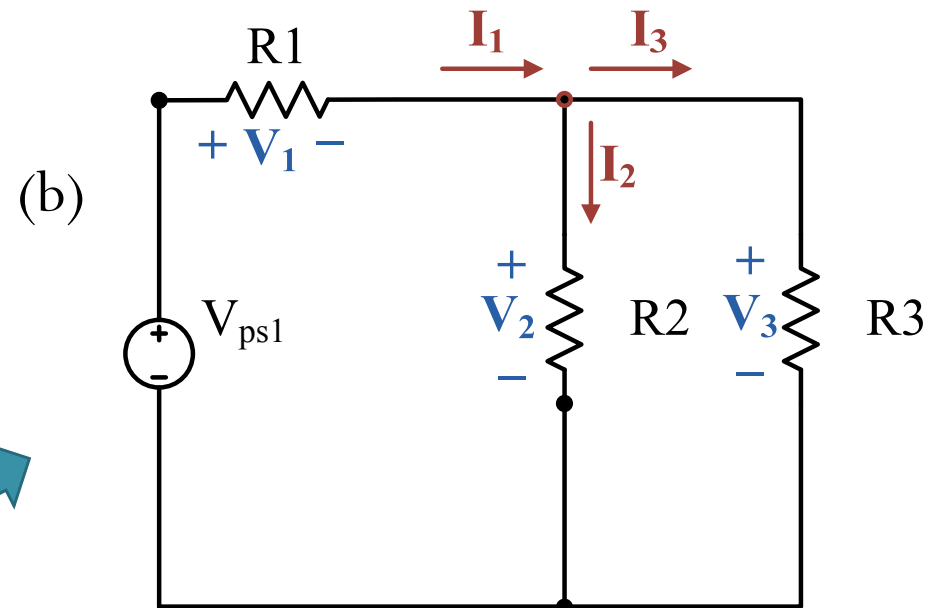
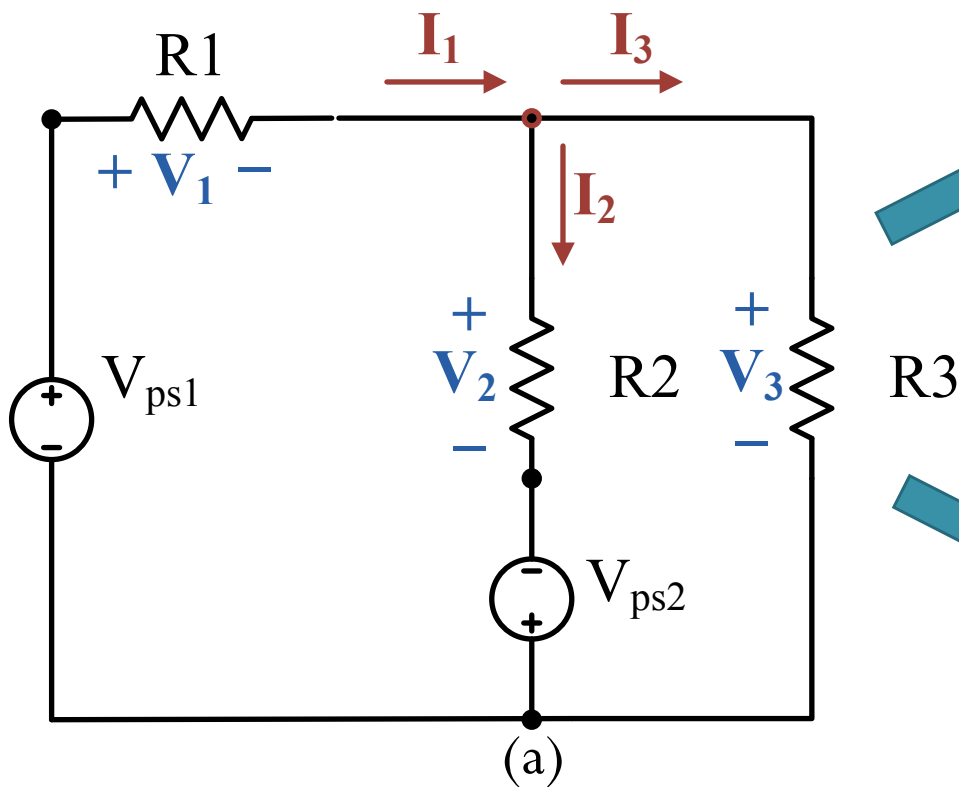
prapun@siit.tu.ac.th



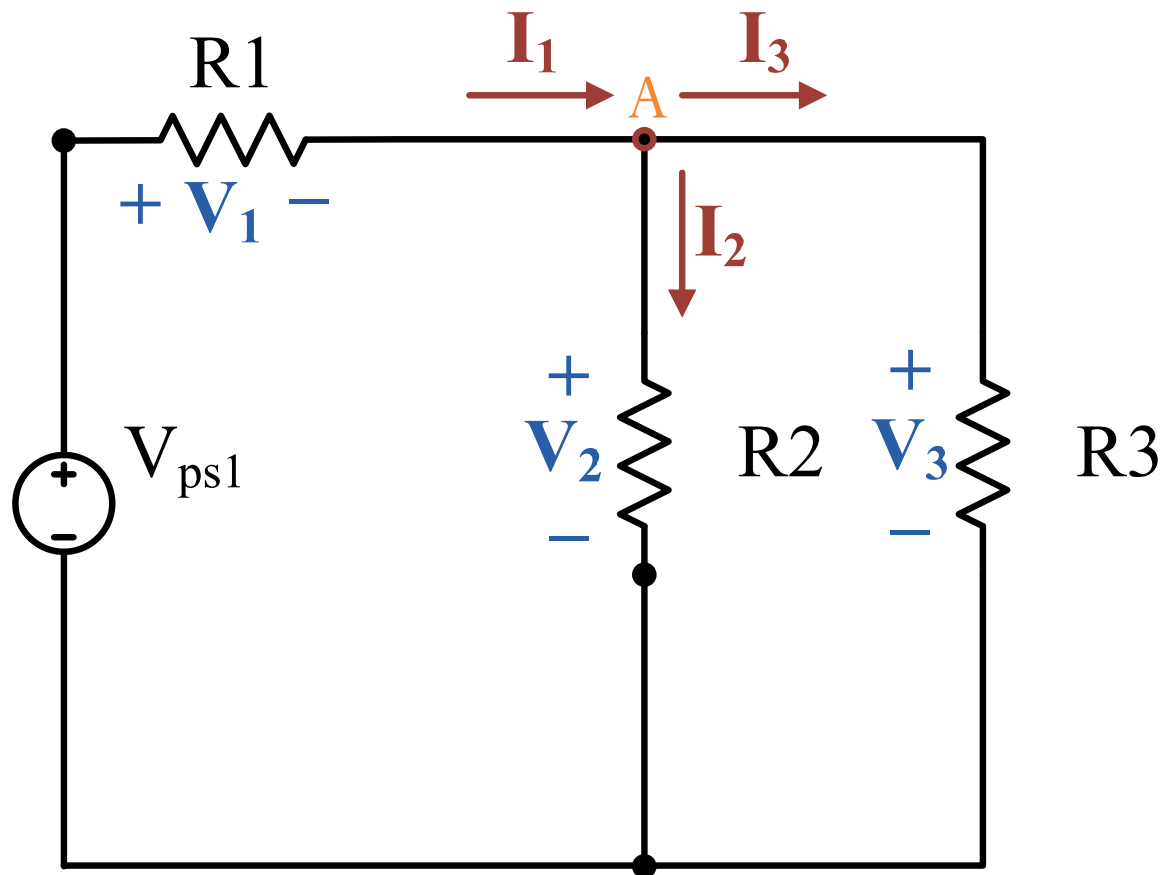
Lab 3

- Superposition Theorem
- Maximum Power Transfer

Part A



A.b



$$V_A^{(b)} = \frac{R_2 // R_3}{R_1 + (R_2 // R_3)} V_{ps1}$$

$$V_1^{(b)} = V_{ps1} - V_A$$

$$V_2^{(b)} = V_A$$

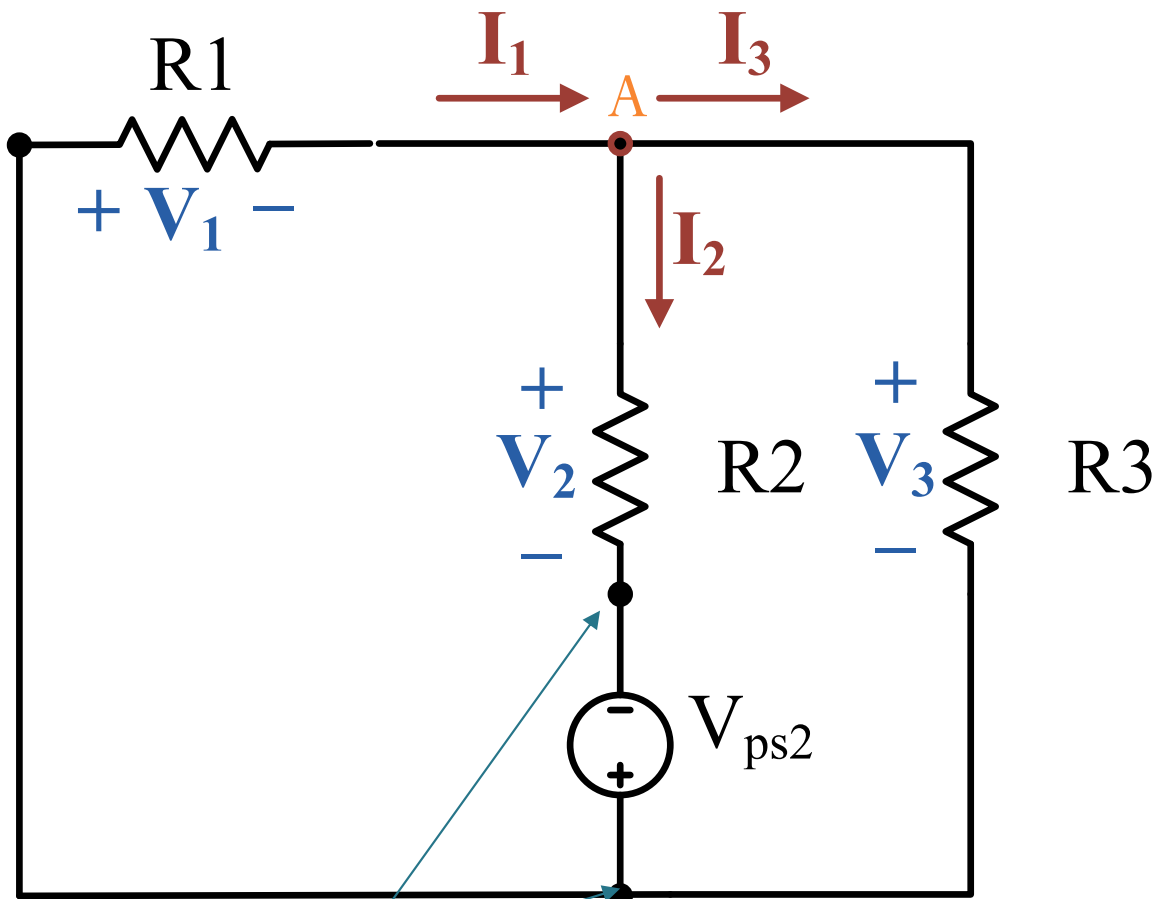
$$V_3^{(b)} = V_A$$

$$I_1^{(b)} = \frac{V_1}{R_1}$$

$$I_2^{(b)} = \frac{V_2}{R_2}$$

$$I_3^{(b)} = \frac{V_3}{R_3}$$

A.c



$$V_A^{(c)} = \frac{R_1 // R_3}{R_2 + (R_1 // R_3)} \times (-V_{ps2})$$

$$V_1^{(c)} = -V_A$$

$$V_2^{(c)} = V_A - (-V_{ps2})$$

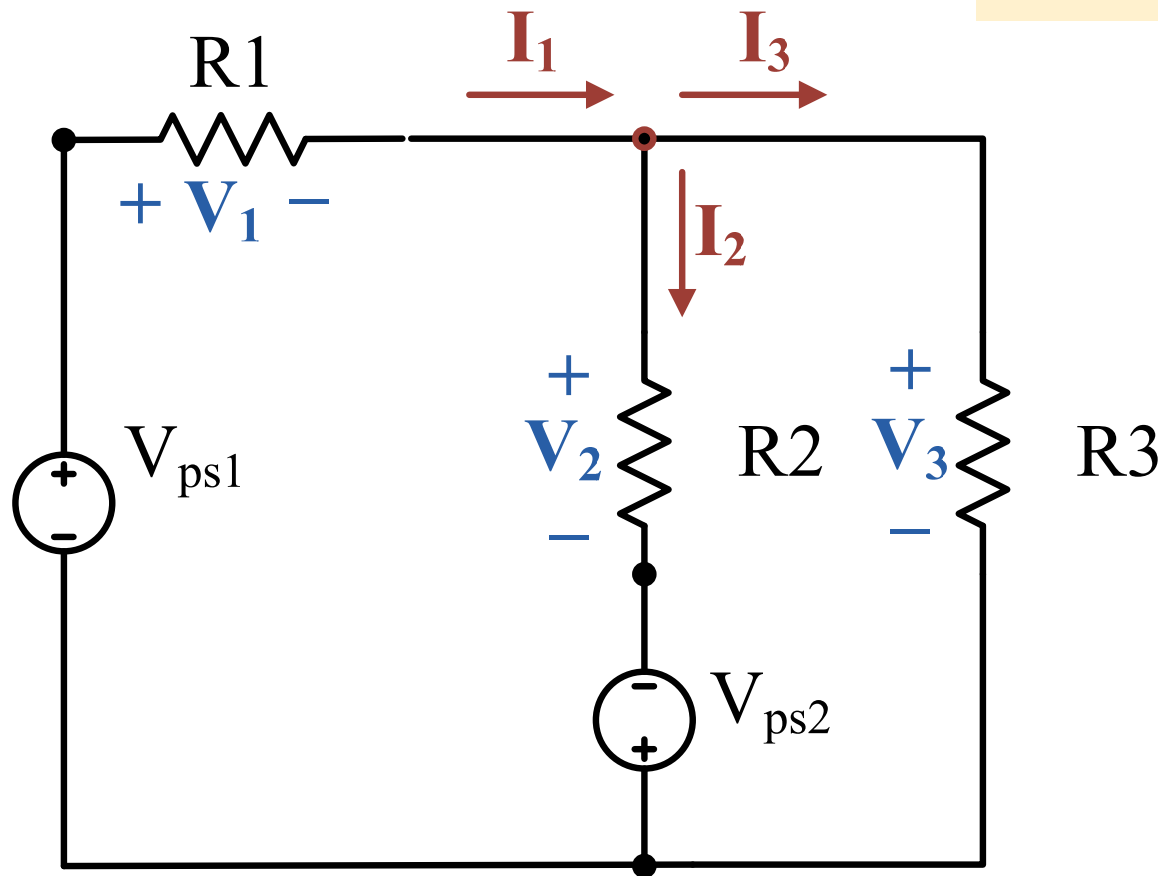
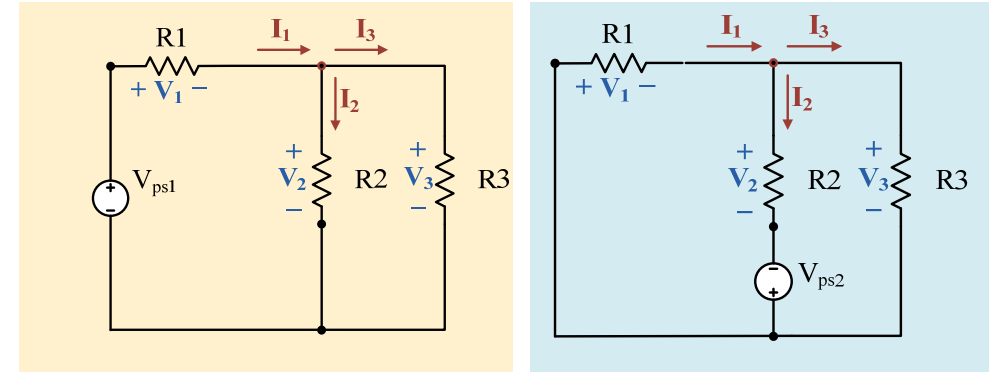
$$V_3^{(c)} = V_A$$

$$I_1^{(c)} = \frac{V_1}{R_1}$$

$$I_2^{(c)} = \frac{V_2}{R_2}$$

$$I_3^{(b)} = \frac{V_3}{R_3}$$

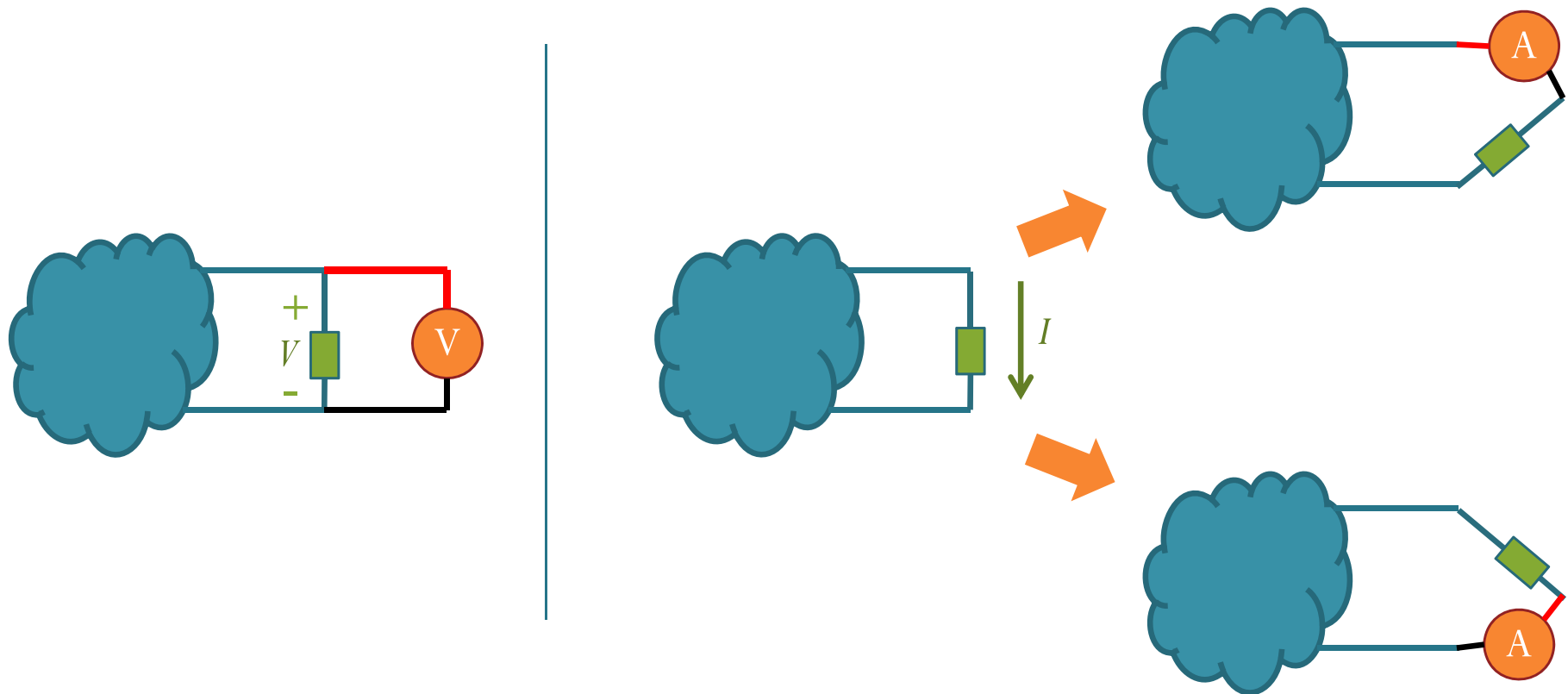
A.a



$$\begin{aligned}
 V_1^{(a)} &= V_1^{(b)} + V_1^{(c)} \\
 V_2^{(a)} &= V_2^{(b)} + V_2^{(c)} \\
 V_3^{(a)} &= V_3^{(b)} + V_3^{(c)} \\
 I_1^{(a)} &= I_1^{(b)} + I_1^{(c)} \\
 I_2^{(a)} &= I_2^{(b)} + I_2^{(c)} \\
 I_3^{(a)} &= I_3^{(b)} + I_3^{(c)}
 \end{aligned}$$

Remark: Some of these values will be negative!!

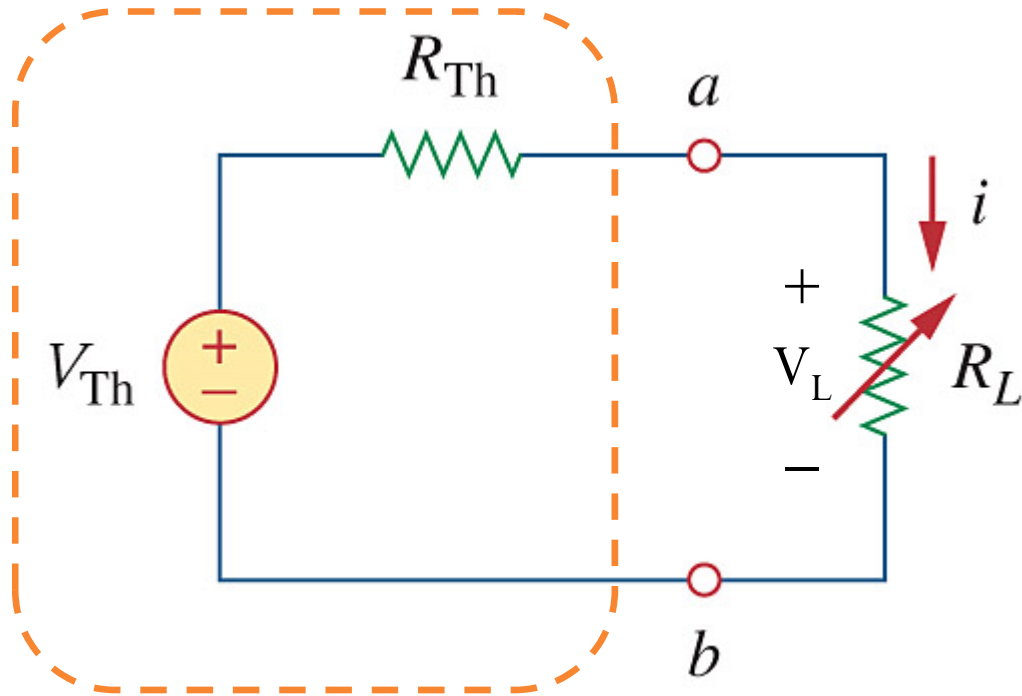
Review: Voltage and Current Measurements



Signs are important in this experiment.

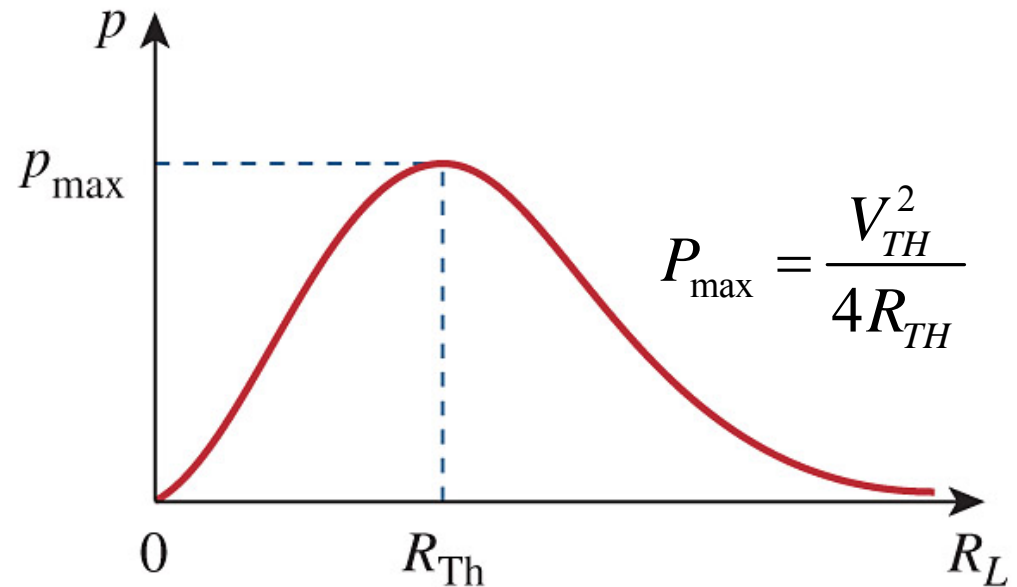
Part B

$$P_L = \frac{V_L^2}{R_L}$$



$R_C = \underline{\hspace{2cm}} \Omega$		$V_{PS1} = \underline{\hspace{2cm}} V$	
$R_L (\Omega)$	$V_L (V)$	Calculated P_L (mW)	
0			
300			
600			
900			
950			
1000			
1050			
1100			
1400			
1700			
2000			

You may have to combine the potentiometer with some regular resistor to produce the desired resistance value.



Announcements

- Next Week (Feb 9)
 - Practice session
 - Practice problems will be posted and available @ the copy center next week.
 - No quiz
 - No attendance check
 - Still need to submit report for lab 3
- Feb 16: Midterm Exam (In Lab)
- Feb 23: Lab 4
- Mar 16: Lab 5