#### Chapter 5 - Circuit Theorems

Lecture 17 Sections 5.6

MEMS 0031 Electrical Circuits

Mechanical Engineering and Materials Science Department University of Pittsburgh Chapter 5 - Circuit Theorems

MEMS 0031

Learning Objectives

5.6 Maximum Power Transfer

Summary



## Student Learning Objectives

At the end of the lecture, students should be able to:

► Construct an expression that relates the maximum power transferred by a circuit to the load resistance

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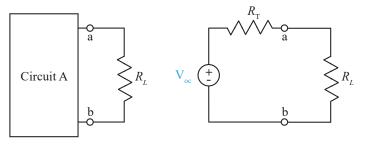
Learning Objectives

.6 Maximum Power Transfer



#### Maximum Power Transfer

- ightharpoonup Choose  $R_L$  to maximize P of the circuit
- ightharpoonup Or, given  $R_L$ , design a circuit to provide maximum P



▶ Remember the expression for Power:

$$P = i^2 R_L = \left(\frac{V_{\rm oc}}{R_t + R_L}\right)^2 R_L$$

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#### Maximum Power Transfer

of  $R_t$  maximizes  $R_L$ ?

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► How do we mathematically determine which value

Learning Object

Learning Objectives
5.6 Maximum
Power Transfer

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### Example #1

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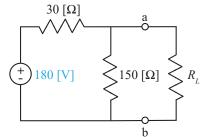
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▶ Find  $R_L$  that maximizes P, and determine P





### Example #2

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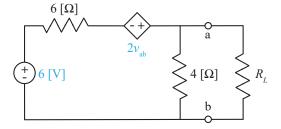
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▶ Find  $R_L$  that maximizes P, and determine P





## Student Learning Objectives

At the end of the lecture, students should be able to:

- Construct an expression that relates the maximum power transferred by a circuit to the load resistance
  - ► Maximum power transfer occurs when the load resistance is equal to the internal resistance of the circuit.

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# Suggested Problems

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6.6 Maximum Power Transfer

Summary



5.6-1, 5.6-2, 5.6-3, 5.6-5, 5.6-6, 5.6-7, 5.6-8