

INITIALS \_\_\_\_\_  
Section (060)

Last 4 digits of ID \_\_\_\_\_  
September 14, 2005

Problem 1 (25 points)

The charge entering the positive terminal of an element is given by the expression:

$$q(t) = -12e^{-2t} \text{ mC.}$$

The power delivered to the element is:

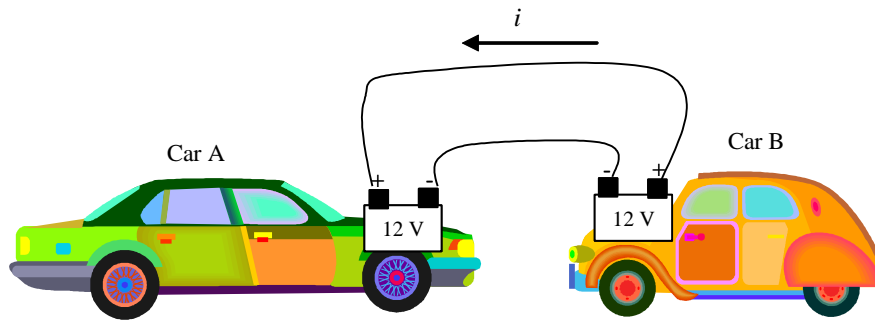
$$p(t) = 2.4 e^{-3t} \text{ W}$$

Compute the current in the element and the voltage across the element.

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## Problem 2 (25 points)

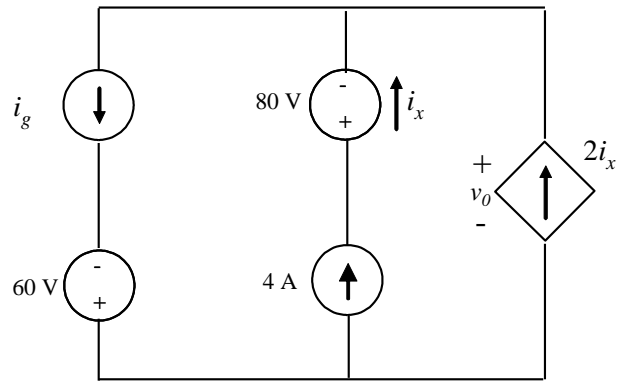
When a car has a dead battery, it can often be started by interconnecting the battery from another car across its terminals. The positive terminals are connected together as are the negative terminals. The connection is illustrated in the following figure. Assume that the current  $i$  in the figure is 30 A.



- Which car has the dead battery? (5 points)
- If this connection is maintained for one minute, how much energy is transferred to the dead battery? (20 points)

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## Problem 3 (25 points)

Find the power (delivered by or absorbed by) in each element in the following circuit if  $v_0 = 100$  V.

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Problem 4 (25 points)

The current  $i_a$  in the circuit shown is 20 A. Find

(a)  $i_0$

(b)  $i_g$

Use any appropriate method to solve the problem.



Exam 1 INEL 3105

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EXTRA SHEET FOR SOLVING PROBLEMS