UNIVERSITY OF CALIFORNIA
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Department of Electrical Engineering
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EEECS100/42, Fall 2009 **T. K. Gustafson**

Fall 2009
Due : Sept 4 2009

Based upon sections 1.1-1.3 of Hambley

Problem Set No. 1

Problem Number one) Charge (flow)
Look at Problem 1.13 for which the answer is supplied.
Hambley Problem 1.14

Problem Number two) Power and voltage and current references
Hambley Problem 1.24

Problem Number three) Ideal voltmeter and ammeter
Hambley Problem 1.27

Problem Number four) Power and Energy
Hambley Problem 1.30

Problem Number five) KVL and KCL
a) Hambley Problem 1.68 Part c)
b) The voltage source is replaced by a time varying voltage $v(t)$ and the 4 Ω resistor is replaced by an element having 4 p Ohms where $p = \frac{d}{dt}$ (This is actually a coil). Obtain a differential equation for the current through the voltage source (current in at the + reference). Leave the answer in terms of R_x. (Note that you cannot assume that the current through the 6 Ω resistor is 1 A)

Problem Number six) KVL and KCL
Hambley Problem 2.22 For part a do the problem as worded
b) Do this problem also by first converting the voltage source and the 12 and 6 Ohm resistors to a Norton equivalent and using the node equations for v_1 and v_2.

Problem Number seven) Ideal versus a real source
Eight flashlight batteries are connected in a row with + connected to - for each battery leaving the initial - (A terminal) and the final + (B terminal) unconnected. Thus the total

voltage V_{BA} is 12 V (just the sum [by KVL]). This is the same as a car battery voltage (12 V). To form a "spark" I touch terminals A and B of the line of 1.5 V batteries. Why would I not want to do this with the car battery? The obvious reason is that I get a "much more intense" spark. But why?