



The Ohio State University
Department of Electrical Engineering

ECE 205

Circuit Analysis

Home work Set # 1

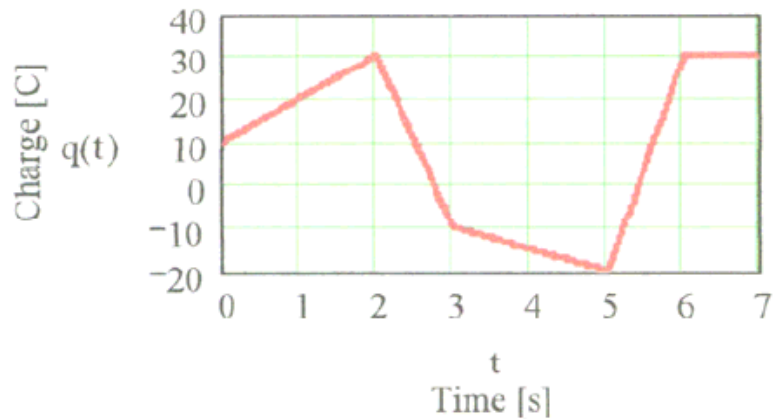
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Problem#1: Problem 1-3 textbook

An ampere-hour (Ah) measures the time integral of the current. The recording of this meter in an 8-hour period is 3300 Ah. Find the number of coulombs that flowed through the meter during the recording time period.

Problem#2: Problem 1-8 textbook

The Figure shows the plot of the net positive charge flowing in a wire. Using MATLAB sketch the plot of the current during the same time period.

**Problem#3: Problem 1-9 textbook**

The net positive charge flowing through the device varies with the equation $q(t) = 3t^2$ C. Find the current through the device at $t=0, t=1$ and $t=3$ sec.

Problem#4: Problem 1-17 textbook

The $i-v$ relationship of a photocell is $i = e^v - 10$ A. For $v=-2, 2$ and 3 V find the device power and state if it is absorbing power or delivering power.

Problem#5: Problem 1-14 textbook

An incandescent lamp absorbs 60 W when connected to 120-V source.

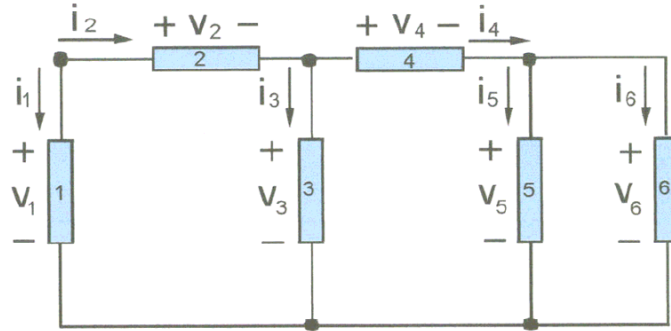
- Find the current through the lamp.
- Find the cost of operating the lamp for 24 hours when electricity cost is 6.8 cents/kWh.

Problem#6: Problem 1-19 textbook

The maximum power a device can dissipate is 0.5 W. Determine the maximum current allowed by the device power rating when voltage is 15 V.

Problem#7: Problem 1-23 textbook

The Figure shows a circuit with voltage and current variable assigned to each of the six devices. Use power balance to find v_4 when $v_1=20$ V, $i_1= -2$ A, $p_2=20$ W, $p_3=10$ W, $i_4=1$ A, and $p_5=p_6=2.5$ W. Is device 4 absorbing or delivering power?

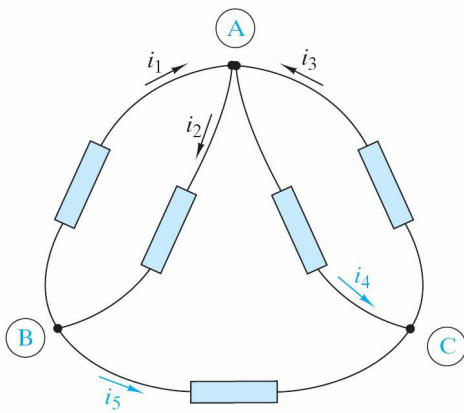


Problem#8: Problem 2-2 textbook

A 6.2 k Ω resistor dissipates 12 mW. Find the current through the resistor.

Problem#9: Problem 2-17 textbook

In Figure $i_2=2$ A, $i_3= -5$ A, and $i_4= 4$ A. Find i_1 and i_5 .



Problem#10: Problem 2-22 textbook

- a) Use the passive sign convention to assign a voltage and current to every element
- b) Use KVL to find the voltage across each resistor.
- c) By using Ohm's law find the current through each resistor.
- d) Use KCL to find the current through each voltage source.

