ELC 2320. Electric Circuit Theory for non-ECE majors. Fall 2021. MWF 10:10 – 11:00, Rogers 106.
Prof. Mack Grady, Rogers 301, Mack_Grady@baylor.edu, 710-3307. Office Hours MWF 3-4pm.
The course will be very similar to last Spring's course. Check out the website
https://web.ecs.baylor.edu/faculty/grady/. The lectures are public on BU public media space
https://mediaspace.baylor.edu/channels

Prerequisites. Completion of EGR 1302 with a grade of B or better. MTH 1322, and credit or concurrent enrollment in PHY 1430.

Topics: Linear circuit elements, sources, Kirchhoff's laws, mesh and node equations, Thevenin and Norton equivalent circuits, resistive network analysis, sinusoidal steady-state analysis, power, transient analysis of simple circuits. Chapters 1 – 5, 7 – 8, 10 – 12 in Wylie's Electrical Circuit Analysis (Baylor) by Dorf and Svoboda.

Tests. Six 30 minute tests, no book, but you are allowed one sheet of notes (both sides). Work paper is provided for the test. Typically held on Fridays of every two-to-three weeks. To discourage copying, each test has several slightly different versions of the same problem(s). Be prepared to work mostly problems with no numbers. Your overall test grade will be based upon your best five tests.

Homework. Problems assigned every class period, and due two classes later (e.g., homework assigned on Monday will be due on Friday). Staple your homework sheets together, and do not fold. Neatness counts since the TA and I will grade them. You are encouraged to work together on homework, but remember that on tests, the work must be all yours.

Notebook. You will be provided with a professional notebook for taking class notes, to tape-in handouts, show in-class examples, and to tape-in homework AFTER it has been graded and returned to you. The notebook should show me what you have learned. You will leave them with me on test days, so I can grade them before the next class.

Final Exam. Comprehensive. You are allowed one sheet of notes, front and back.

Grading. 60% Tests, 10% Homework, 10% Notebook, 20% Final Exam. Typically the top third get A's, middle third get B's, some bottom thirds get C's or lower.

Other Items. I plan to video-record all lectures for BU's public https://mediaspace.baylor.edu/channels. Be prepared to answer questions in class about HW problems. When needed, we can have evening TEAMS meetings to work on homework problems together. Regular attendance is important and affects your grade. All Baylor policies will be followed.

Voltage — Volts

Current — Amps

Resistance — Ohms Ω

Power — Watts W

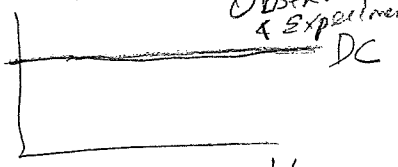
Energy — Joules J = W·sec

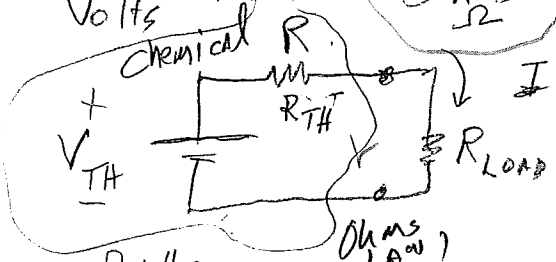
$V = IR$, $I = \frac{V}{R}$

Stick with the Formulas & Rules
NO guessing

$\int_0^t V(t)\,dt$ — Volts

From Observation & Experiments

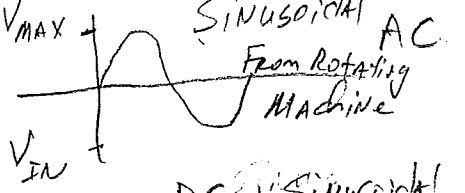




Battery

$I = \frac{V_{TH}}{R_{TH} + R_{LOAD}}$ KVL

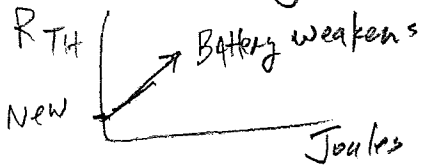
Ohms Law, KVL



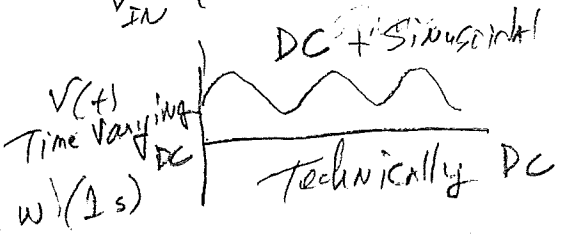
DC has one polarity + or − not both

Strong Battery, Small R_{TH}

Weak Battery, Larger R_{TH}



V_{TH}



1 Joule = (1 W)(1 s)

1 kW = 1000 W

1 kW·sec = 1000 J

1 KWHR = (1000 W)(3600 sec/HR)

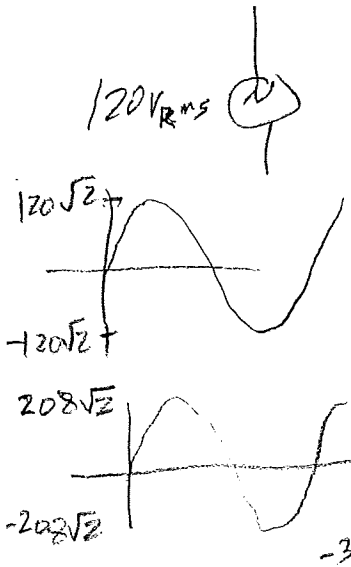
= 3,600,000 J

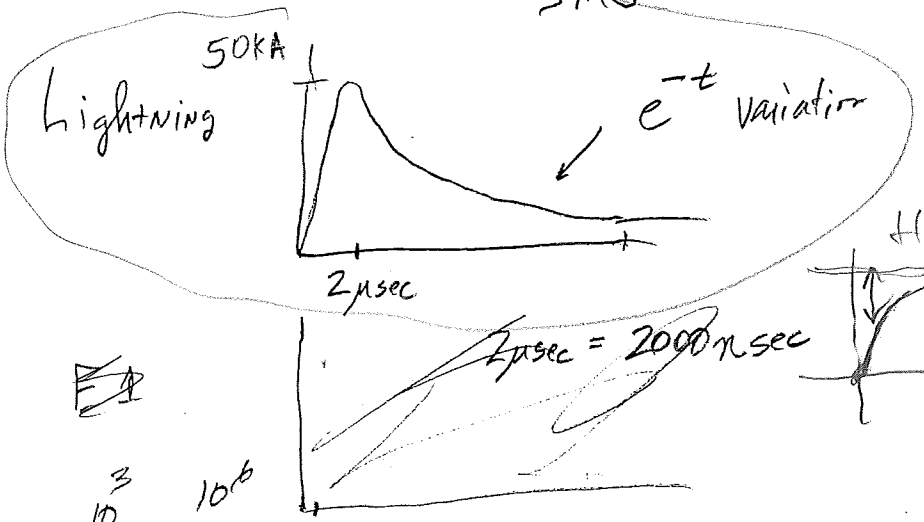
Teaspoon of Gasoline ?

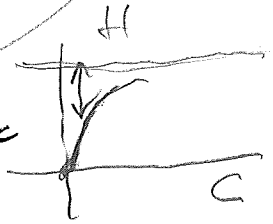
Use Units to check ANSWERS

12¢

= 3MJ







10^{-9} 10^{-6} 10^{-3} 10^{3} 10^{6}

nV μV mV V KV MV

Battery V, I, J Graphs

Decimal Points — $3\frac{1}{2}$ digits

begins 2-9 3 by hand $\pm N$

$\Rightarrow 9.01 \times 10^{N}$

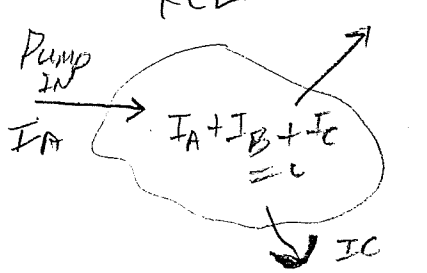
begins 1 $\Rightarrow 1.010 \times 10^{-N}$

$= 10.10 \times 10^{-3}$

Chapter 16

$4\frac{1}{2}$ or higher

KCL



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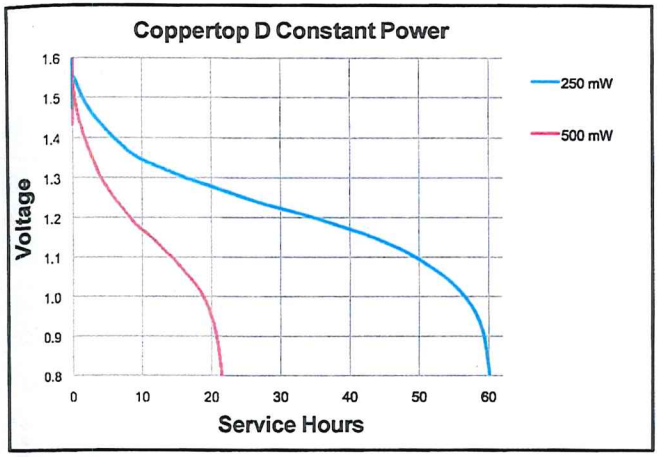

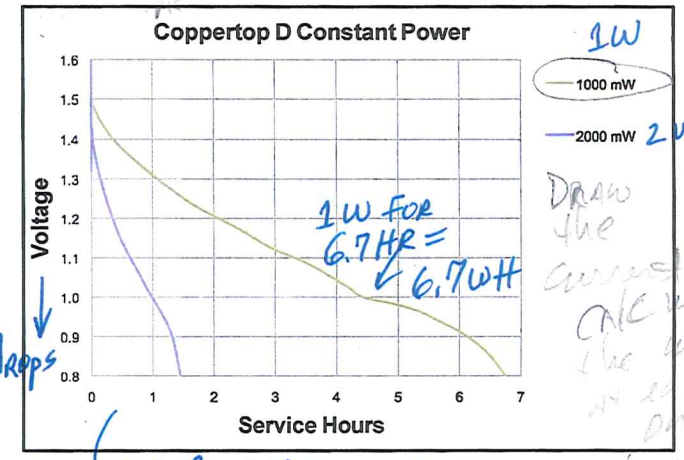

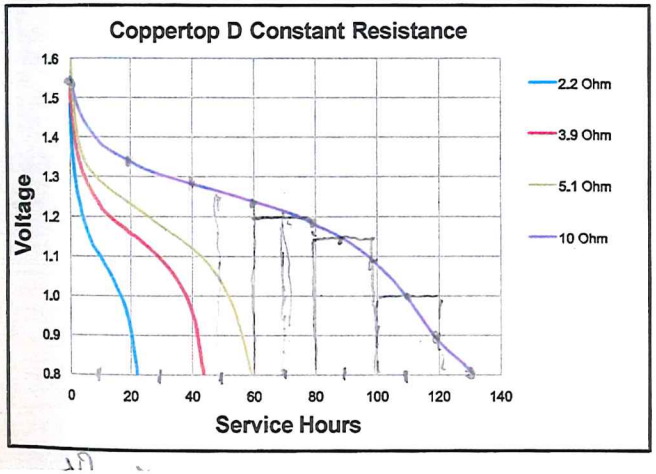

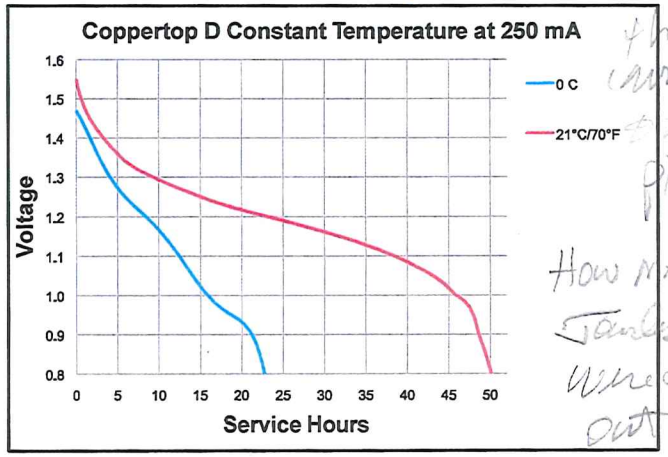

Draw the curves and the graph and sketch the curves of the graph

How many Joules were drawn out?