

- Scheduled for Tuesday, 18 Feb 2014.
- No books, notes, calculators or collaboration.
- Show all work neatly and clearly for full credit.
- Covers material taken from lectures; sections 2.1-2.3, 2.5, 2.7, 2.9-2.15, 2.17, 2.23; and homeworks 1-5.

Topics:

1. Concept/definition of
 - (a) voltage, v
 - (b) current, i
 - (c) power, p ; PSC and conservation
 - (d) loops and nodes
 - (e) KCL
 - (f) KVL
 - (g) node-voltages, common/reference/ground
 - (h) series and parallel
2. Multipliers (p, n, μ , m, k, M, G)
3. Circuit elements
 - (a) ideal voltage and current sources (symbols and general behavior)
 - (b) resistors (symbol, Ohm's Law, series and parallel equivalents, and general concept)
 - (c) capacitors (symbol, v-i equation in general and DC, series and parallel equivalents, and general concept)
4. Measurement of voltage, current and resistance
 - (a) instruments (voltmeter, ammeter, ohmmeter) and appropriate connections
5. Wire - resistance, gauge, current capacity
6. SPICE - netlist
7. Circuits with resistors and independent sources
 - (a) analyze via KCL, KVL, Ohm's Law, and/or reduction
 - (b) find equivalent resistance, voltages (element- or node-), currents, and powers
8. Charging and discharging circuits
 - (a) KVL to find differential equation
 - (b) mathematical expression for capacitor's voltage which can be used to find expressions for resistor's voltage and current
 - (c) time-constant, τ
 - (d) 10%-90% rise-time, t_r ; estimate using time-constant and definition
 - (e) sketches of voltages and current using time-constant