

- Scheduled for Tuesday, 08 Apr 2014.
- No books, notes, calculators or collaboration.
- Show all work neatly and clearly for full credit.
- Covers material taken from lectures; sections 2.20, 8.1-8.4, 12.1, 12.2; and homeworks 6-10.

Topics:

1. Alternating Current (AC) and cosines
 - (a) Direct Current (DC) versus AC
 - (b) General form: $v(t) = V_P \cos(\omega t - \phi_v)$, $i(t) = I_P \cos(\omega t - \phi_i)$
 - (c) equation \leftrightarrow sketch
 - (d) peak value (amplitude)
 - (e) peak-to-peak value
 - (f) root-mean-square (RMS) value
 - (g) period
 - (h) frequency
 - (i) angular frequency
 - (j) time-shift
 - (k) phase-shift
2. Operational amplifiers (op-amps)
 - (a) symbol
 - (b) rules and ideal assumptions
 - (c) saturation
 - (d) solve for outputs and gains of circuits with negative feedback
3. Digital electronics
 - (a) analog signals versus digital signals
 - (b) counting and addition of binary numbers
 - (c) table of 4-bit binary, octal, decimal and hexadecimal numbers
 - (d) binary numbers \leftrightarrow decimal numbers
 - (e) logic gates (AND, NOT, OR)
 - (f) combinational logic circuit
 - (g) truth table
 - (h) Boolean (logical) expression
 - (i) sum-of-products (SOP) expression
 - (j) simplification via Karnaugh maps (K-maps)