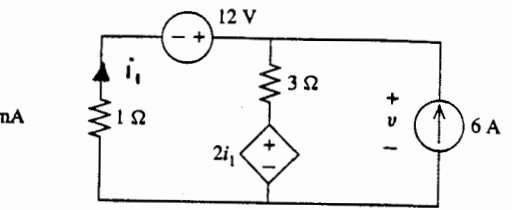
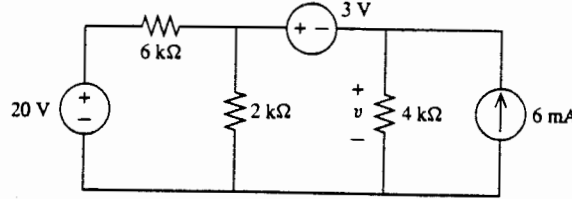
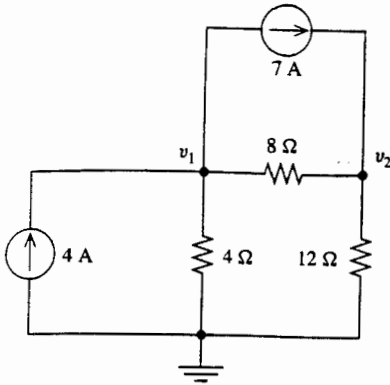


- (30) 3. Write out the *node equations* for each circuit. Simplify but do NOT solve (whew!).
 For (a): 2 equations in 2 unknowns v_1, v_2 . For (b) & (c): 1 equation in 1 unknown v .



EECS 210 SOLUTIONS TO EXAM #1 (9:30) Winter 2001

GIFTS [1a. (i) $\frac{100}{\sqrt{2}}$ (ii) 200 (iii) $\frac{1}{7}$ (iv) 7 (v) 14π . (1b.) (i) 1 (ii) 1 (iii) 3 and 5.

ONLY 9 SERIOUSLY MISSED

1c. $\cos(2\pi t) + 20 \cos(6\pi t)$ since the last term at 5 Hz is filtered out. THOUGHT dBV?
 1d. $\cos(2\pi t - 10^\circ) + 2 \cos(6\pi t - 30^\circ) + 4 \cos(10\pi t - 50^\circ)$ since $-20\text{dB} = 0.1$.
 (2) SEVERAL FORGOT THIS TERM, OR -10° ! AMPLITUDES @ 2, PHASES @ 1 MULTIPLIED WHOLE THING BY $\sqrt{2}$. (2)

GIFT [2a. Voltage divider $\rightarrow (12V) \frac{10\Omega}{10+5\Omega} = 8V$.

VERY HARD! [2b. (i) Current source: $I_a + I_B$ (ii) Voltage source: 10V (iii) $\frac{R_1 R_3}{R_1 + R_3} + \frac{R_2 R_4}{R_2 + R_4}$] GIFT
 (SHOULDNT HAVE BEEN THAT HARD)

~1/2 GOT [2c. Node equation: $\frac{V-16}{8} + \frac{V}{12} = 3 \rightarrow 5V = 48 + 72 = 120 \rightarrow V = 24V$. NOT VOLTAGE + CURRENT DIVIDERS!
 COMPLETELY RIGHT. MANY SIGN ERRORS \rightarrow WRONG VALUES. POWER NOT CONSERVED SHOULD HAVE TIPPED YOU OFF.
 $8\Omega: (1A)^2(8\Omega) = 8W$. $12\Omega: \frac{(24V)^2}{12\Omega} = (2A)^2(12\Omega) = 48W$. MY FAVORITE ERROR: $P = iR^2$!
 $16V: (16V)(1A) = 16W$. $3A: (24V)(-3A) = -72W$. $8 + 48 + 16 - 72 = 0$.

3a. $\frac{V_1}{4} + \frac{V_1 - V_2}{8} = 4 - 7$; $\frac{V_2 - V_1}{8} + \frac{V_2}{12} = 7$ PROBLEMS WITH SIGNS OF CURRENT SOURCES!
 $\rightarrow 3V_1 - V_2 = -24$; $-3V_1 + 5V_2 = +168 \rightarrow V_1 = 4V, V_2 = 36V$.] THIS LINE NOT NECESSARY

3b. $\frac{V}{4} + \frac{V+3}{2} + \frac{V+3-20}{6} \rightarrow 11V - 16 = 72 \rightarrow V = 8V$. (SCALING BY 10^3)

3c. $\frac{V-12}{1} + \frac{V-2i_1}{3} = 6$; $i_1 = -\frac{V-12}{1} \rightarrow V - 12 + V - 8 = 6 \rightarrow V = 13V$. NEED BOTH EQNS OR (5)
 AMAZING # HFD $i_1 = V-12$ NOT $12-V$!!! LOOK CLOSER... DIDN'T SUB (2)

EXAM: 81 80 80 80 80 77 77 76 75 74 72 70 70 70 68 68 67 64 62 57 56 51 50 44 40 36 23 17

SCORES: 98 98 97 96 95 95 94 93 92 91 90 89 89 88 88 88 88 88 87 86 85 85 84 83 83 82 81

MEDIAN: 81
 # TAKING: 59
 (1 PENDING)