EECS170A Spring 2007 **Final Exam** Name:_____

6/12/2007 10:30 to 12:30 pm ID no.:_____

Professor Peter Burke

1	2	3	4	5	6	Total
/10	/10	/10	/25	/20	/25	/100

DO NOT BEGIN THE EXAM UNTIL YOU ARE TOLD TO DO SO.

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PROBLEM ONE: (20 points)

The differential equation that describes the voltage in an *RLC* network is

$$\frac{d^2v}{dt^2} + 5\frac{dv}{dt} + 4v = 0$$

Given that $v(0) = 0$, $dv(0)/dt = 10$ obtain $v(t)$.

Use the mathematical tools you learned for analyzing linear RLC circuits: First, find $s_{1,2}$ for the general solution, then decide whether it is under damped or overdamped, then find the constants and hence v(t) from the initial values.

PROBLEM TWO:

State and describe Thevenin's Theorem.

State and describe Norton's Theorem.

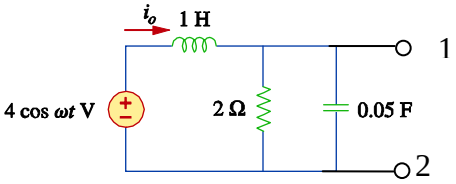
PROBLEM THREE:

Describe the concept of transient response and of linear RLC circuits.

Describe the concept of steady state response and of linear RLC circuits.

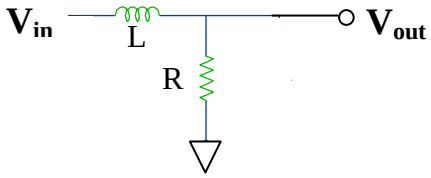
PROBLEM FOUR:

Using Phasors, find the Thevenin equivalent voltage $\boldsymbol{V}_{\mathrm{Th}}$ and impedance $\boldsymbol{Z}_{\mathrm{Th}}$ at terminals 1-2 of the circuits shown below. (You need not simplify your result.)



PROBLEM FIVE:

Using Phasors, find $\mathbf{V_{out}/V_{in}}$ for the circuit below. Sketch the magnitude of $\mathbf{V_{out}/V_{in}}$ vs. frequency.



PROBLEM SIX:

Determine $i(t)$ for $t > 0$ in the circuit below.