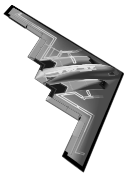
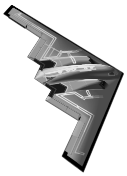
O K L A H O M A S T A T E U N I V E R S I T Y

SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING



ECEN 3723 Systems I
Spring 2003
Midterm Exam #2



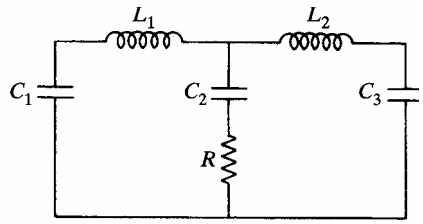
Choose any four out of five problems.
Please specify which four listed below to be graded:
1)_____; 2)_____; 3)_____; 4)_____;

Name : _____

Student ID: _____

E-Mail Address:_____

Problem 1:
Consider the electric circuit shown below. Using the force-current analogy to derive an ***analogous*** mechanical system. Show the detailed procedure and the resulted mechanical diagram.



Problem 2:

Evaluate $\lim_{k\to\infty}\sum_{i=0}^{k} ie^{-2i}$.

Problem 3:

Find $x(k)$, the inverse z-transform of $X(z) = \ln\left(\frac{2z}{2z-1}\right)$.

Problem 4:

Given z transform of $k^5 5^k u(k)$ is $X(z)$, find the $y(k)$, such that $Y(z) = \frac{1}{z} X(2z)$.

Problem 5:
The input $x(k) = u(k) - 2u(k-2) + u(k-4)$ is applied to a linear time-invariant discrete-time system. The resulting response with no initial energy is $y(k) = ku(k) - ku(k-4)$. Determine the impulse response function of the system, $h(k)$.