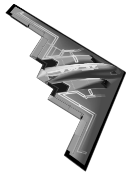
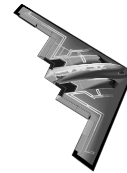


OKLAHOMA STATE UNIVERSITY
SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING



ECEN 3723 Systems I
Spring 2002
Midterm Exam #1



Name : _____

Student ID: _____

E-Mail Address: _____

Problem 1:

Find the Laplace transforms of

a) $\frac{d}{dt}(\cos(\omega t + \theta))$, and

b) $t^2 \sin(t - 2)e^{-2t}u(t - 1)$.

Problem 2:

Find the Inverse Laplace transforms of

a) $\frac{2s^2 e^{-s}}{(s+1)(s^2+2s+2)}$, and

b) $s \ln \frac{s+a}{s+b}$.

Problem 3:

Solve the following differential equations (to find $x_1(t)$) in state space form

$$\left\{ \begin{array}{l} \frac{dx_1(t)}{dt} = x_2(t) \\ \frac{dx_2(t)}{dt} = x_3(t) \\ \frac{dx_3(t)}{dt} = -3x_1(t) - 2x_2(t) + x_3(t) + e^{-t}u(t) \end{array} \right. ,$$

where $x_1(0) = 1, x_2(0) = 0$ and $x_3(0) = 1$.

Problem 4:

Determine the Laplace transform of the following signal, $x(t)$, with only *ten* periods (cycles).

(Note that the maximum amplitude is V with period T)

