

King Fahd University of Petroleum & Minerals
Department of Electrical Engineering
EE 207 – Signals and Systems
Term 061
Project No. 2 (5%)

Due January 6, 2007

Student Name : _____

Student Number : _____

Section #: _____

The use the *symbolic toolbox of Matlab*

1) Study the Matlab program of Example 5-1 (pages 210-211) to calculate Laplace transform and its inverse. Type the following example in the command window:

```
%Example 5-1
x1 = sym('cos(omega_0*t)');      % Define x1
x1                                % Display x1
X1 = laplace(x1);                % Laplace transform x1
X1                                % Display X1
x2 = sym('sin(omega_0*t)');      % Define x2
x2                                % Display x2
X2 = laplace(x2);                % Laplace transform x2
X2                                % Display X2
pretty(X2)                       % Pretty print X2
x2_p = ilaplace(X2)              % Inverse Laplace transform X2
```

Now, use Matlab to find the Laplace transforms of the following signals:

a) $x_1(t) = \cos(\omega_0 t) e^{-\alpha t} u(t)$

b) $x_2(t) = t^2 \cos(\omega_0 t) e^{-\alpha t} u(t)$

Show the program codes and results and verify results by manual evaluation

2) Study the Matlab program of Example 5-4 (pages 214-215). The program calculate the inverse Laplace transform of a rational function. Type the following in the command window:

```
X = sym('(s+8)/(s^2+6*s+13)');
x = ilaplace(X);
pretty(X)
pretty(x)
```

Now, use Matlab to find the Laplace transforms of the following signals:

a) $X(s) = \frac{7s^3 + 20s^2 + 33s + 82}{(s^2 + 4)(s + 2)(s + 3)}$

$$\text{b) } X(s) = \frac{2s^3 + 9s^2 + 22s + 23}{[(s+1)^2 + 4](s+1)(s+3)}$$

$$\text{c) } X(s) = \frac{s^2(s+9)}{(s+3)^3(s+1)}$$

Show the programs codes and results and verify results by manual evaluation
Use a cover page with your name, ID number date, and section number.