NAME:

ID.NO:

Problem	Score	Problem	Score
I.(20)		VI.(10)	
II.(12)		VII.(14)	
III.(12)		VIII.(10)	
IV.(10)			
V.(12)			
		Total	

MA 266, Second MidTerm Examination, Wilkerson Sections

Second Portion, Nov. 28, 2000 ME 161 7PM

You must have completed and turned in the first portion of the exam before you can receive and work on this second. Do all your work on the question sheets. Calculators are NOT allowed. NO BOOKS OR PAPERS ARE ALLOWED. Use the back of the test pages for scrap paper.There is a short table of LaPlace transforms on the last page. You can remove this for use.

In Problems II. and III. find the general solution of the homogeneous differential equations in (a) and use the method of undetermined coefficients to find the general **form** (i.e. don't solve for the coefficients) of a particular solution of the nonhomogeneous equations in (b) .

II. (12 points)

(a) $y'' - 2y' = 0$

(b) $y'' - 2y' = e^{2t}$

III. (12 points)

(a) $y'' - 2y' + y = 0$

(b) $y'' - 2y' + y = te^t$

IV.(10 points) Find the solution of the following initial value problem using your choice of the following methods: a) undetermined coefficients b) variation of parameters or c) Laplace transforms. Show your work.

$$y'' + y = t^2,\ y(0) = 0,\ y'(0) = 0.$$

V.(12 points)

(a) Find the general solution of the homogeneous differential equation

$$y'''' - y = 0.$$

Hint: Factor $r^4 - 1 = (r^2 + 1)(r^2 - 1)$. Then factor $(r^2 + 1)$ and $(r^2 - 1)$ ...

(b) Use the method of undetermined coefficients to find the general **form** of a particular solution of the nonhomogeneous equation

$$y''' + 3y'' + 2y' = t + e^t$$

You do not need to solve for the values of the coefficients.

VI.(10 points)

(a) $\mathcal{L}\{4 + e^{-3t}\sin 2t\} =$

(b) $\mathcal{L}\left\{u_3(t)e^{2t} + t^2e^{-2t}\right\} =$

VII. In (a) use the step functions $\{u_c(t)\}$ to solve. (14 points)

(a) $f(t) = 0$ if $t < 1$

$f(t) = 3$ if $1 \leq t < 2$

$f(t) = t + 1$ if $t \geq 2$

Sketch the graph of $f(t)$ and find $\mathcal{L}\left\{f(t)\right\} =$

(b) If $y'' + 3y' + y = \delta(t-2) + u_3(t)e^t,\ y(0) = 1,\ y'(0) = 21$, then find $\mathcal{L}\left\{y\right\}$. Do not solve for $y(t)$.

VIII.(10 points)

(a)$\mathcal{L}\left\{\int_0^t e^{-3\tau}\cos(t-\tau)\,d\tau\right\} =$

(b) $\mathcal{L}^{-1}\left\{(s)/(s^2-3s-10)\right\} =$

Hint: use partial fractions.