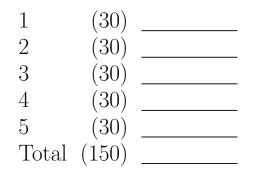## DEPARTMENT OF MATHEMATICS
UNIVERSITY OF KANSAS
MATH 220 - Spring 2007 - EXAM 3

Your Name: _____

On this exam, you may use a calculator and books and notes.
It is not sufficient to just write down the answers. You must explain how you arrived
at your answers and how you know they are correct.

1	(30)	_____
2	(30)	_____
3	(30)	_____
4	(30)	_____
5	(30)	_____
Total	(150)	_____

(1) Solve

$$y'' + 2y' + 2y = h(t) = \begin{cases} 1 & \pi < t < 2\pi \\ 0 & 0 \le t < \pi \quad \text{and} \quad t \ge 2\pi \end{cases}$$

with initial conditions $y(0) = 0, y'(0) = 1$. Find $\lim_{t \to \infty} y(t)$.

(2) Find the inverse Laplace transform of the function

$$F(s) = \frac{se^{-2s}}{(s^2 + 1)(s^2 + 2s + 1)}.$$

(3) Solve
$$y'' - 2y' + 2y = \cos(t),$$
with initial condition $y(0) = 1, y'(0) = 0$.

(4) Solve

$$y'' + y = g(t) = \begin{cases} t/2 & 0 < t < 6 \\ 3 & t \geq 6 \end{cases}$$

with initial data $y(0) = 0, y'(0) = 0$.

(5) Solve
$$y'' + 2y' + 3y = sin(t) + \delta(t - 3\pi)$$
with initial data $y(0) = 0, y'(0) = 0$.