Math 242, 1990, Final Exam

There are 6 problems worth a total of 200 points. Use your own paper. SHOW your work. $\boxed{BOX}$ your answer.

1. (30 points) Find the general solution of

$$y' + y = e^x.$$

2. (30 points) Find the general solution of

$$y'' + y = e^{5x}.$$

3. (35 points) Use power series techniques to find the general solution of $y'' + 4y = 0$.

4. (35 points) Find the general solution of

$$4x^2y'' - 4xy' + 3y = 8x^{4/3}.$$

5. (35 points) Use the technique of Laplace transforms to solve

$$tx'' + (t-2)x' + x = 0 \qquad x(0) = 0.$$

6. (35 points) Solve the Initial Value Problem

$$x'' + 4x = f(t) \qquad x(0) = x'(0) = 0$$

for

$$f(t) = \begin{cases} 1, & \text{if } 0 \le t \le \pi \\ 0, & \text{if } \pi < t. \end{cases}$$