MATHEMATICS 202
SPRING SEMESTER 2006-07
QUIZ II

Time: 70 MINUTES.

Date: April 28, 2007.

Name:——————————————————-

ID Number:——————————————————

Section Number:————————————————

Course Instructors: Professors Abdallah Lyzzaik and Hassan Yamani

Question	Grade
1	/20
2	/20
3	/20
4	/20
5	/10
6	/10
TOTAL	/100

Answer The Following Six Questions On The Page Allocated For Each Question (You May Use The Back Of The Pages If Needed).

1. Find the general solution of the differential equation

$$y^{(4)} + 2y''' + 11y'' + 2y' + 10y = 0$$

knowing that one of its solutions is $y = \cos x$. (20 points)

2. Find the general solution of the differential equation

$$x^2y'' - xy' + y = x^2.$$

(20 points)

3. Use the method of undetermined coefficients to find the general solution of the differential equation

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

(20 points)

4. Use the substitution $x = e^t$ to transform the Cauchy-Euler differential equation

$$x^2y'' + 10xy' + 8y = x^2$$

to a differential equation of constant coefficients, then solve the differential equation. **Show all the details of your work**.

(20 points)

5. Find the general solution of the differential equation

$$xy'' - (x+1)y' + y = 0$$

knowing that $y_1 = e^x$ is a solution. (10 points)

6. Can the set $\{x^2, x^3\}$ be a fundamental set over $(-\infty, \infty)$ for a linear homogeneous differential equation

$$a_2(x)y'' + a_1(x)y' + a_0(x)y = 0,$$

where a_2, a_1, and a_0 are continuous functions of $(-\infty, \infty)$ with $a_2(x) \neq 0$ for all x? **Justify your answer**.

(10 points)