

**NDU**  
**MAT 235**  
**Ordinary Differential Equations**  
**Make Up Exam # 2**

**Duration: 55 minutes**

**Name:** \_\_\_\_\_

**Section:** \_\_\_\_\_

**Instructor:** \_\_\_\_\_

**Grade:** \_\_\_\_\_

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**MAT 235 – Make Up Exam #2; Monday June 7, 2004**

**Name:**

**Instructor:**

**Please note that you have 5 questions and 7 pages  
and your mobile must be turned off and unseen**

- 1) (15 points) Find the general solution of the differential equation  $x^3 y'' + xy' - y = 0$ , for  $x > 0$ , given that  $y_1 = x$  is a particular solution.

**2) (15 points)** Find the general solution of the differential equation  $y''' - 3y'' + 2y' = x + e^x$ .

**3) (15 points)** Solve the following differential equation  $x^2y'' + 5xy' + 4y = \frac{1}{x^2}$ ; for  $x > 0$ .

**4) (15 points)** Solve the differential equation  $y^{(5)} + 6y''' + 9y' = 0$ .

**5) (30 points)** Given  $x(1-x)y'' + 2(1-x)y' + 2y = 0$ , for  $x > 0$ .

a) Show that  $x_0 = 0$  is a regular singular point.

b) Find the indicial roots.

c) Find the generalized power series solution in powers of  $x$ .

