University of Toronto Midterm 2 - Nov 7, 2012

MAT 244F – Ordinary Differential Equations Instructors: E. Meinrenken, T. Bazett Duration – 50 mins

NO CALCULATORS, CELL PHONES, OR OTHER AIDS ALLOWED.

Total Marks=40

Problem #1: [8 points]

Solve the following initial value problem

$$y'' + 2y' + 5y = 0, \quad y(0) = 0, y'(0) = -2$$

Problem #2: [7+8+7+2 =24 points]

a) Find a fundamental set of solutions of the following equation AND compute their Wronskian

$$y'' - 4y' + 4y = 0$$

b) Find a particular solution of

$$y'' - 4y' + 4y = \cos(t)$$

c) Find a particular solution of

$$y'' - 4y' + 4y = \frac{e^{2t}}{t}, \quad t > 0$$

d) Find a general solution of

$$y'' - 4y' + 4y = \cos(t) + \frac{e^{2t}}{t}, \quad t > 0$$

Problem #3: [8 points]

Find a fundamental set y_1, y_2 of solutions of

$$t^{2}y'' + t(t+2)y' + ty = 0, \quad t > 0.$$

Hint: $y_1(t) = t^{-1}$ is one solution.