## ÇANKAYA UNIVERSITY DEPARTMENT OF MATHEMATICS March 28, 2005

Math 258 Mathematics for Electronic Engineers II Midterm 1

Duration: 90 min. Problems 1. (15 pts.) Solve

$$e^{-y}\frac{dy}{dx} = \frac{x}{x^2 + 1}.$$

 $2.~(15~\mathrm{pts.})$  Solve

$$\frac{dy}{dx} - \frac{3}{x+1}y = -2(x+1)^4$$

 $3.~(20~{\rm pts.})$  Solve

$$x^{2}y'' - 3xy' + 4y = 0, \quad y(1) = 0, y'(1) = 3.$$

 $4.~(15~\mathrm{pts.})$  Determine the general solution

$$2xy\frac{dy}{dx} + x^2 + y^2 = 0, \quad (y = xv)$$

 $5.~(20~\mathrm{pts.})$  Find the general solution of the differential equation

$$9\frac{d^2y}{dx^2} + 6\frac{dy}{dx} + y = 50e^{-\frac{1}{3}x}$$

## $6.~(20~{\rm pts.})$ Find the general solution to

 $ty'' - (t+1)y' + y = t^2$  (Independent Variable: t), given that  $y_1(t) = e^t$  and  $y_2(t) = t+1$  form a fundamental set of solutions.