淡江大學 101 學年度碩士班招生考試試題

系別：土木工程學系　　科目：工 程 數 學

考試日期：2 月 26 日(星期日) 第 3 節　　本試題共 5 大題， 1 頁

1. Solve the equation (20%)

$$(e^{2y} - y\cos(xy))dx + (2xe^{2y} - x\cos(xy) + 2y)dy = 0$$

2. Find the general solution of equation: (20%)

$$y'' + 4y = (x+1) + 2e^{-2x}$$

3. Solve the system of differential equations and initial conditions for function x and y (20%)

$$x'' - 2x' + 3y' + 2y = 4$$
$$2y' - x' + 3y = 0$$
$$y(0) = x(0) = x'(0) = 0$$

4. Find the solution of this system or show that the system has no solution (20%)

$$-X_1 - X_2 + 2X_3 = 5$$
$$3X_1 + X_2 + 6X_3 = 1$$
$$X_1 - X_2 + 10X_3 = -1$$

5. Find the eigenvalues and their corresponding eigenvectors (20%)

$$A = \begin{bmatrix} 3 & 0 & -2 \\ 0 & 2 & 0 \\ -2 & 0 & 0 \end{bmatrix}$$