

# 淡江大學八十八學年度碩士班招生考試試題

系別：電機工程學系

科目：工程數學

本試題共 一 頁

一.  $y'' + x^2 y' + 4y = 1 - x^2$

Find  $y(x) = ?$

(20%)

二. Let  $u(x, y)$  be continuous with continuous first and second partial derivatives on a simple closed path  $C$  and throughout the interior  $D$  of  $C$ . Show that

$$\oint_C -\frac{\partial u}{\partial y} dx + \frac{\partial u}{\partial x} dy = \iint_D \left[ \frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} \right] dx dy \quad (20\%)$$

三. Find the Fourier transform of  $\frac{t}{a^2 + t^2}$ , where  $a$  is a constant.

(20%)

四.  $A = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ , Find  $A^{50} = ?$

(20%)

五. Use the residue theorem to compute  $\int_0^\infty \frac{\sin x}{x} dx$ .

(20%)