

系別：電機工程學系

科目：工程數學

准帶項目請打「V」

X

簡單型計算機

本試題共 1 頁

一. Find the solution of the equation

$$[e^x \sin y - 2x] dx + [e^x \cos y + 1] dy = 0 \quad (20\%)$$

$$二. \quad x^2 y'' - 5xy' + 10y = 0 \quad y(1) = 4, \quad y'(1) = -6$$

(20%)

$$三. \quad \oint_C \frac{-y}{x^2 + y^2} dx + \frac{x}{x^2 + y^2} dy = ?$$

with  $C$  any simple, positively oriented path in the plane but not passing through the origin. (20%)

四. Find the Fourier transform of  $f(t) = \begin{cases} 1 - |t|, & \text{for } |t| < 1 \\ 0, & \text{otherwise} \end{cases}$   
(20%)

五. Evaluate  $\oint_P \frac{4iz - 1}{\sin(z)} dz$ , with  $P$  any simple, positively oriented path in the plane encloses the poles  $0, \pi, 2\pi$  and  $-2\pi$  but no other singularities of  $\frac{4iz - 1}{\sin(z)}$ . (20%)