

# 國立臺北科技大學

九十三年度冷凍空調工程系碩士班入學考試

## 工程數學試題

填准考證號碼

第一頁 共一頁

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### 注意事項：

1. 本試題共四題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

1. (20%) Solve the following differential equations.

(a) (10%)  $y'' + y = 6 \cdot \sin x$

(b) (10%)  $(x - 2y + 3)dx + (2x - 4y - 3)dy = 0$

2. (25%) Apply the Laplace transform to solve the system governed by the following equations and boundary conditions.

Governing equations: 
$$\begin{cases} x'' - 2x' + 3y' + 2y = 4 \\ 2y' - x' + 3y = 0 \end{cases}$$

Boundary conditions :  $x(0) = x'(0) = y(0) = 0$

3. (25%) Using Green's theorem, evaluate the following line integral counter-clockwise around the given contour,  $C: x^2 + 4y^2 = 4$ .

$$\int_C (2x - y)dx + (x + 3y)dy = ?$$

4. (30%) Solve the function  $u(x, y)$  in the following problem.

Governing equation: 
$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = m^2 u$$

Boundary conditions:  $u(x, 0) = u(x, L) = u(0, y) = 0, u(\infty, y) = u_b$