

# 國立臺北科技大學九十七學年度碩士班招生考試

系所組別：2230 電腦與通訊研究所丙組

## 第一節 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. 本試題共五題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

(務請依序作答，並詳列推導過程，否則不予計分，謝謝配合。)

一、Find the general solution to the following first-order differential equation. (20%)

$$(2x - 4y + 5)y' + x - 2y + 3 = 0$$

二、Solve the following first-order initial value problem. (20%)

$$x^2 y' + 2xy - x + 1 = 0 \quad \text{with } y(1) = 0$$

三、Find the solution to the following second-order initial value problem. (20%)

$$y'' - 2y' + 10y = 0 \quad \text{with } y(0) = 4 \text{ and } y'(0) = 1$$

四、Solve the following second-order nonhomogeneous equation. (20%)

$$y'' - y' - 2y = 10 \cos x$$

五、Please use the method of separation of variables to find the solution to the following second-order boundary value problem. (20%)

$$\frac{\partial^2 V(x, y)}{\partial x^2} + \frac{\partial^2 V(x, y)}{\partial y^2} = 0$$

with  $x = 0 \sim \infty$ ,  $y = 0 \sim b$ ,  $V(0, y) = V_0$ ,  $V(\infty, y) = 0$ ,  $V(x, 0) = 0$ , and  $V(x, b) = 0$