

# 國立臺北科技大學 101 學年度碩士班招生考試

系所組別：3210 環境工程與管理研究所甲組

## 第二節 工程數學 試題

第一頁 共一頁

### 注意事項：

1. 本試題共 7 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。

1. To give the general solution for the differential equation : (10%)

$$xy' - 5y = 2x^4$$

2. To give the general solution for the differential equation : (10%)

$$(x+3)y'' - (2x+3)y' + (x+1)y = 0$$

3. To solve the following initial value differential equation : (15%)

$$xy' + 3y - e^x = 0, \quad y(1) = 2e$$

4. To solve the following initial value differential equation : (15%)

$$y'' - y = 2x^2 - 4x + e^x, \quad y(0) = y(1) = 0$$

5. To give the general solution for the differential equation : (15%)

$$y'' - 2y = 3 \sin(x) \quad y_p = -\sin(x) \quad (p: \text{particular})$$

6. To find the solution for the following linear system (equations) : (15%)

$$\begin{cases} x_1 + 3x_2 + x_3 + 3x_4 = 1 \\ 2x_1 + 2x_2 + 2x_3 + 3x_4 = 2 \\ 2x_1 + 5x_2 + 2x_3 + x_4 = 1 \\ x_1 + 3x_3 + 2x_4 = 3 \end{cases}$$

7. To find the Fourier transform for the following function : (20%)

$$F(x) = -\pi/3, \quad 0 < x < \pi,$$

$$F(x) = \pi/3, \quad \pi < x < 2\pi, \quad \text{and}$$

$$F(x) = F(x+2\pi)$$