

國立臺北科技大學九十九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%)

$$(x^2 + y^2)dx - 2xydy = 0$$

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

$$(1 + x^2) dy = 2(1 - xy) dx$$

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

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

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

$$y'' - y = 3x^2 - 4x + e^x, \quad y(0)' = y(0) = 0$$

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

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

6. What is the Fourier series expansion of the periodic function whose definition in one period is: (20%)

$$f(x) = 0, \quad 0 \leq x < \pi$$

$$f(x) = \sin x, \quad \pi \leq x \leq 2\pi$$

7. What is the Fourier series expansion of the following function whose definition in one period is: (20%)

$$f(x) = x, \quad -\pi \leq x < 0$$

$$f(x) = 0, \quad 0 \leq x \leq \pi$$