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：3210 環境工程與管理研究所甲組

第二節　工程數學　試題

填 准 考 證 號 碼

注意事項：

1. 本試題共七題，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%)

$y'' - 2y' + 10y = 0$

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

$xy' - 3y = x^4$

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

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

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

$x^2y'' + (5/2)xy' - y = x^2, \quad y(1)' = y(1) = 0$

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

$$\begin{cases} x_1 + 2x_2 + 2x_3 + 3x_4 = 1 \\ 2x_1 + 2x_2 + 2x_3 + 3x_4 = 0 \\ 2x_1 + 6x_2 + 2x_3 + x_4 = 2 \\ x_1 + \quad 3x_3 + 2x_4 = 3 \end{cases}$$

6.To give the Laplace transform [i.e. F(s)] for the following function： (15%)

$f(t) = \sin^2 t$

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

$F(x) = -\pi/4, \quad -\pi < x < 0,$

$F(x) = \pi/4, \quad 0 < x < \pi,$ and

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

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