

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：1410 1420 1431 1432

能源與冷凍空調工程系碩士班甲乙丙組

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。

一、 Please find the solutions of the following equations:

1. $y' + x^2 y = x^2 y^{-2}$; $y(0) = 2$ (10%)

2. $x^2 y'' - 5xy' + 10y = 0$; $y(1) = 4$, $y'(1) = -6$ (10%)

二、 Please find the Power Series solution of the following equation: (20%)

$y'' - xy' + e^x y = 4$; $y(0) = 1$, $y'(0) = 4$

三、 Please find the solutions of the following system of equations using Laplace Transform: (20%)

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

四、 Please find the solution of the following equation: (20%)

$u_{yx} + 2u_x = x$, $u(0, y) = 0$, $u_x(x, 0) = x^2$

五、 Please find the solution of the following equation: (20%)

$u_t = k u_{xx}$ for $0 < x < \pi$, $t > 0$

$u(0, t) = u(\pi, t) = 0$ for $t > 0$

$u(x, 0) = x^2 \cos(x/2)$ for $0 \leq x \leq \pi$