

國立臺北科技大學 102 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

第一頁 共一頁

注意事項：

1. 本試題共四題，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. Please solve the following first-order differential equations:

(a) (10%) $y' = y^2 e^{-x}$; $y(1) = 4$

(b) (10%) $x - xy - y' = 0$

(c) (10%) $xy' = \frac{y^2}{x} + y$

2. Please solve the following second-order differential equations:

(a) (10%) $y'' - 4y' + 53y = 0$; $y(\pi) = -3$, $y'(\pi) = 2$

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

(c) (10%) $y'' + 2y' - 3y = 8e^x$

3. (20%) Please solve the following problem by Power Series method

$$y'' + xy' - y = e^{3x}$$

4. (20%) Please solve the following problem by Laplace Transform

$$y'' - 3y' + 2y = 4t; \quad y(0) = 1, \quad y'(0) = -1$$