

## 國立臺北科技大學 109 學年度碩士班招生考試

系所組別：1411、1412、1413、1421、1422

能源與冷凍空調工程系碩士班甲、乙組

## 第一節 工程數學 試題

第 1 頁 共 1 頁

**注意事項：**

1. 本試題共 6 題，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
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. Solve the following ordinary differential equation. (15%)

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

2. Assume the differential equation is  $y'' + 4y' + 4y = \sin^2 t$ . Find the particular solution  $y_p(t)$  by the method of undetermined coefficients. (15%)

3. Solve the following ordinary differential equation by the Frobenius method. (20%)

$$4xy'' + 2y' + y = 0$$

4. Find the inverse Laplace transform of the function. (15%)

$$F(s) = \frac{3s + 5}{s^2 + 4s + 8}$$

5. Solve the following ordinary differential equation by Laplace transform. (15%)

$$ty'' - ty' + y = 0, \quad y(0) = 0, \quad y'(0) = 1$$

6. Solve the integral-differential equation for the unknown function  $y(t)$  by Laplace transform. (20%)

$$y'(t) + \int_0^t y(\tau) d\tau = 2, \quad y(0) = 3$$