

# 國立臺北科技大學 111 學年度碩士班招生考試

系所組別：1410、1420

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，配分共 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. (15%) Solve the following ordinary differential equation.

$$y' + y \tan x = \sin 2x, \quad y(0) = 1$$

2. (15%) Find the solution by the method of undetermined coefficients.

(未定係數法)

$$y'' + 4y = 8x^2$$

3. (20%) Find the solution by the power series method. (冪級數法)

$$(1 - x^2) y'' + xy' - y = 0$$

4. (15%) Determine the Laplace transform of

$$f(t) = t \sin(\omega t), \quad \omega = \text{constant}$$

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

$$y'' - y = t, \quad y(0) = 1, \quad y'(0) = 1$$

6. (20%) Solve the following ordinary differential equation by the Laplace transform.

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

where  $\delta(t - 1)$  is delta function.