RA01

國立臺北科技大學108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

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 Bernoulli differential equation. (15%)

$$y' + \frac{1}{x}y = 3x^2y^3$$

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

$$y'' + 2y' - 3y = 4x^2 - x + 11e^{2x}$$

3. Find the solution by a power series method. (20%)

$$y'' + x^2y = 0$$

4. Solve the initial value problem by Laplace transform. (15%)

$$y'' + 4y = f(t)\ , y(0) = 0\ ,\ y'(0) = 0$$

where $f(t) = \begin{cases} 0 \ for\ t < 3 \\ t \ for\ t \geq 3 \end{cases}$

5. Solve the initial value problem by Laplace transform. (15%)

$$y'' - 2y' - 8y = f(t)\ , y(0) = 1\ ,\ y'(0) = 0$$

6. Solve the initial value problem by Laplace transform. (20%)

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