

國立臺北科技大學九十九學年度碩士班招生考試

系所組別：1201, 1202, 1203 製造科技研究所

第一節 微分方程 試題

第一頁 共一頁

注意事項：

1. 本試題共五題，每題 20 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. Find the general solution of the following differential equation.

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

2. Find the general solution of the following differential equation.

$$x^2 y'' - 4xy' + 6y = x^4 e^x$$

3. Solve the differential equation by using the Laplace Transform method.

$$y'' + 2ty' - 4y = 6 \quad y(t=0) = 0, \quad y'(t=0) = 0$$

4. By using the Frobenius method, find and solve the first three nonzero terms of two linearly independent solutions for the following differential equation.

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

5. Find the general solution for the system of linear differential equations.

$$x' = x + 2y + z$$

$$y' = 6x - y$$

$$z' = -x - 2y - z$$

$$(where \quad x' = dx / dt \quad y' = dy / dt \quad z' = dz / dt)$$