

國立中央大學100學年度碩士班考試入學試題卷

所別：企業管理學系碩士班 一般甲組(一般生) 科目：工程數學 共一頁 第一頁

本科考試禁用計算器

*請在試卷答案卷(卡)內作答

In this exam, x or t is the independent variable and y (or y_1, y_2, y_3) is the dependent variable, which we would like to know/solve.

1. (10 pts.) Please solve $y' = \frac{y + 4x^5 \cos^2(\frac{y}{x})}{x}$

2. (10 pts.) Please solve $y' = \frac{\cos x + \sin x}{e^x}$

3. (10 pts.) Please find the Inverse Laplace transform of

$$\frac{2s + 6}{(s^2 + 6s - 7)^2}$$

4. (10 pts.) Please solve the following integral function:

$$y(t) = -1 + t + 2 \int_0^t y(t - \tau) \sin(\tau) d\tau$$

5. (12 pts.) Please solve $y' = \frac{x^3 y^2 - y}{x}$

6. (12 pts.) Please Solve $y''' - 2y'' - 4y' + 8y = e^{-x} + x^2$

7. (12 pts.) Please solve the following differential system:

$$y_1' = 2y_1 + y_2 - y_3$$

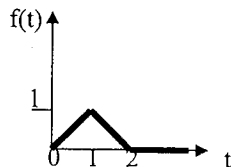
$$y_2' = 2y_2 + y_3$$

$$y_3' = 2y_3$$

8. (12 pts.) Please use the method of power series to solve

$$y'' - 8xy = 1 + 2x. \text{ Show five terms } (a_0x^0 + \dots + a_4x^4) \text{ in your answer.}$$

9. (12 pts.) Find the Laplace and Fourier transforms of the following $f(t)$.



參考用