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 $y' = \dfrac{y + 4x^5 \cos^2(\frac{y}{x})}{x}$

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

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 $y' = \dfrac{x^3y^2 - y}{x}$

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

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

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

8. (12 pts.) Please use the method of power series to solve $y'' - 8xy = 1 + 2x$. Show five terms ($a_0x^0 + \ldots + a_4x^4$) in your answer.

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