

淡江大學 106 學年度日間部轉學生招生考試試題

系別：化材系、航太系三年級

科目：工程數學

3-68

考試日期：7月21日(星期五) 第3節

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**Problem One (25 points)**

Find the general solution of the following *linear* differential equation.

$$y' + \frac{1}{x}y = \sin x$$

**Problem Two (25 points)**

Find the general solution of the following *nonhomogeneous* differential equation.

$$y'' + 5y' + 6y = 4 \cos x$$

**Problem Three (25 points)**

Use the Laplace transform method to solve the following *nonhomogeneous* differential equation.

$$y'' - 4y' + 4y = te^t \quad y(0) = 0; \quad y'(0) = 1$$

提示：  $\mathcal{L}[t^n e^{at}] = \frac{n!}{(s-a)^{n+1}}$

**Problem Three (25 points)**

Use the method of separation of variables to solve the following *partial* differential equation.

$$\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2} \quad 0 \leq x \leq 1$$

B.C.  $u(0, t) = u(1, t) = 0$

I.C.  $u(x, 0) = 2$