

國立臺北科技大學

九十四學年度電腦與通訊研究所入學考試

工程數學 (丙組) 試題

填准考證號碼

第一頁 共一頁

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注意事項：

1. 本試題共 5 題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

(20 %) 1. Consider the following differential equation for $t \geq 0$

$$\frac{dy(t)}{dt} + y(t) = \frac{dx(t)}{dt} - 2x(t).$$

Let $x(0) = 0$ and $y(0) = 0$; solve for $y(t)$ in terms of $x(t)$.

(20 %) 2. Solving $y''(x) + 2y'(x) + y(x) = 2\cos(3x)$ with $y(0) = y'(0) = 0$.

(20 %) 3. Solving $y''(t) - 4y'(t) + 3y(t) = 6t - 8$ with $y(0) = y'(0) = 0$.

(20 %) 4. Find a particular solution for

$$y''(t) + 3y'(t) + 2y(t) = \begin{cases} 0 & t \leq 0 \\ e^{-3t} & t > 0 \end{cases}$$

(20 %) 5. Solving $\frac{\partial^2 u(x,t)}{\partial t^2} - c^2 \frac{\partial^2 u(x,t)}{\partial x^2} = 0$ with $u(x,0) = x^2$ and $\frac{\partial u(x,0)}{\partial t} = cx$, where c is a constant.