

淡江大學九十二學年度轉學生招生考試試題

系別：工組三年級

科目：工 程 數 學

准帶項目請打「○」否則打「×」

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簡單型計算機

本試題共 / 頁

1. Find the integration factor and solve the equation:

$$(3 \cos y - 4x^2) dx = 5x \sin y dy \quad (25\%)$$

2. Solve the initial value problems:

(a) $y'' + 4y' + 6y = x^2 + \cos x$, $y(0) = 0$, $y'(0) = 0$ (10%)

(b) $y'' + 10y' + 25y = e^{-5x}$, $y(0) = 1$, $y'(0) = 0$ (15%)

3. Use the "Laplace Transform" to solve the initial value problems:

$$y'' + 10y' + 25y = e^{-5x} + 2, \quad y(0) = 1, y'(0) = 0 \quad (25\%)$$

4. Solve the following system of equations by the method of undetermined coefficients; (25%)

$$\begin{aligned} \dot{y}_1 &= y_2 + 5e^{2t} \\ \dot{y}_2 &= y_1 - 2e^{2t} \end{aligned}, \quad y_1(0) = 11, \quad y_2(0) = 0$$