

臺灣綜合大學系統 111 學年度學士班轉學生聯合招生考試試題

科目名稱	工程數學	類組代碼	D36
		科目碼	D3691

※本項考試依簡章規定所有考科均「不可」使用計算機。

本科試題共計 1 頁

- [10%] Please solve the initial value problem, $x^2 \frac{dy}{dx} + xy = \sin x$ and $y(1) = A$, where A is a constant value.
- [20%] Please find the particular solution of $y''' + y'' = 3e^x + 4x^2$.
- [20%] Please find the general solution of $y' = \begin{bmatrix} 9 & 4 & 0 \\ -6 & -1 & 0 \\ 6 & 4 & 3 \end{bmatrix} y$.
- [20%] Please find the Fourier series of the period 2π function that is defined in one period to be

$$f(t) = \begin{cases} 0, & \text{if } -\pi < t \leq 0 \\ t, & \text{if } 0 \leq t < \pi \\ \frac{2\pi}{3}, & \text{if } t = \pm\pi \end{cases}.$$
- [30%] Please find the steady-state oscillations of $y'' + ky' + y = f(t)$, where $k > 0$ and

$$f(t) = \begin{cases} t, & \text{if } -\pi/2 < t < \pi/2 \\ \pi - t, & \text{if } \pi/2 < t < 3\pi/2 \end{cases} \quad \text{and } f(t) = f(t + 2\pi).$$