臺灣綜合大學系統113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

1. [10%] Find the general solution of the ODE $y' - y = 4$.
2. [10%] Find the particular solution of the ODE $xy' + 4y = 8x^4, y(1) = 2$.
3. [20%] Find the solution set of the ODE $y'' - 3y' - 4y = 0, y(0) = 1$ and $y'(0) = 2$.
4. [20%] Let $\mathbb{A} = \begin{bmatrix} B & C \\ D & E \end{bmatrix}$ and its inverse $\mathbb{A}^{-1} = \begin{bmatrix} X & Y \\ Z & U \end{bmatrix}$, where B, C, D, E are all known matrices. Please evaluate X and U.
5. [20%] Using the Cramer's rule to solve the linear system for which $\begin{cases} -2w + x - y = 1 \\ w - 2x + z = -5 \\ w - 2y + z = -7 \\ x + y - 2z = 7 \end{cases}$.
6. [20%] Please derive the Fourier series for any period, i.e., $p = 2L$, based on the Fourier series for $p = 2\pi$, and derive the corresponding Euler formulas for Fourier coefficients using the orthogonality of the trigonometric system.