科目名稱	工程數學	類組代碼	D14
		科目碼	D1491

※本項考試依簡章規定各考科均「不可以」使用計算機 　　本試題共計 **1** 頁

1. Find the eigenvalues and eigenvectors of (15 %)

$$A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}.$$

2. Please solve the initial value problem. (15 %)

$$y''' + 6y'' + 11y' + 6y = 2e^{-4x}, y(0) = -\frac{1}{3}, y'(0) = \frac{4}{3}, y''(0) = -\frac{16}{3} \quad (y^{(n)} = \frac{d^n y}{dx^n})$$

3. (20 %)

(a) Please find the Laplace transform of the function $t^3 e^{-2t}$.

(b) Please find the inverse Laplace transform of the function $\dfrac{2s+1}{s^2 + 2s + 5}$

4. Find the Fourier transform of the function f(x). (15 %)

$$f(x) = \begin{cases} |x| & if & -1 < x < 1 \\ 0 & otherwise \end{cases}$$

5. Solve the linear system, show details. (15 %)

y+z-2w=0
2x-3y-3z+6w=2
4x+y+z-2w=4

6. Evaluate the integrals. (20%)

(a) $\displaystyle\int_0^1 \int_{x^2}^x (1 - 2xy)\, dy\, dx$ 　　(b) $\displaystyle\int_{-\infty}^{\infty} \frac{\cos x}{x^4 + 1}\, dx$