

臺灣綜合大學系統 114 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

請於答案卡上作答，否則不予計分。

- [10%] What is the general solution of the ODE $y'' + 9y = 0$?
 (A) $y = A\cos(3x) + B\sin(3x)$ (B) $y = Ae^{3x} + Be^{-3x}$
 (C) $y = Ax + B$ (D) $y = Ax^2 + Bx + C$ (E) none of the above
- [10%] Given $f(t) = t^2$, what is the Laplace transform of $f(t)$?
 (A) $1/s^2$ (B) $2/s^3$ (C) $2/s^2$ (D) s^2 (E) none of the above
- [10%] Which of the following functions is suitable for a Fourier sine series expansion on the interval $[0, L]$?
 (A) Even function (B) Periodic function (C) Odd function (D) Any discontinuous function
 (E) none of the above
- [10%] What is the determinant of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 9 & 8 & 7 \end{bmatrix}$?
 (A) 3 (B) 2 (C) 1 (D) 0 (E) none of the above
- [10%] Let $\vec{F} = \nabla\phi$. What is $\nabla \times \vec{F}$?
 (A) Undefined (B) Always unity (C) Equal to $\vec{F}$ (D) Equal to $\nabla^2\phi$ (E) none of the above

請於答案卷上作答，否則不予計分。

- [10%] Let $\vec{F} = yz\vec{i} + xz\vec{j} + xy\vec{k}$, please find the divergence and curl of $\vec{F}$.
- [20%] Please find the eigenvalues and eigenvectors of the matrix $A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$.
- [20%] Find the Fourier series expansion of the function $f(x) = x^2$ for $0 < x < \pi$.