招 生 學 年 度	105	招 生 類 別	碩士班
系 所 班 別	光電工程學系碩士班、電機工程學系碩士班		
科 目 名 稱	工程數學		
注 意 事 項	本考科可使用掌上型計算機		

1. Solve

$x_1 + x_2 + x_3 = 3$

$2x_1 + x_2 - x_3 = 2$ (10%)

$2x_1 + x_2 - 2x_3 = 1$

2. Find the determinant of the matrix $\begin{bmatrix} 2 & 5 & 4 \\ 3 & 1 & 2 \\ 5 & 4 & 6 \end{bmatrix}$.   (10%)

3. Let $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$, find A^{-1}.   (10%)

4. Find all possible values of a that would make the following matrix singular:

$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 9 & a \\ 1 & a & 3 \end{bmatrix}$.   (10%)

5. Find the distance from the point (2, 1, –2) to the plane $6(x–1) + 2(y–3) + 3(z+4) = 0$.   (10%)

6. Are the following functions linearly independent or dependent on the given interval?   (10%)

(a) $\ln x$, $(\ln x)^2$ (x>1)

(b) $\sin(2\pi x)$, $\cos(\pi x)\sin(\pi x)$ (x>0)

7. Find an integrating factor and solve the initial value problem.   (20%)

$(e^{x+y} + ye^y)dx + (xe^y - 1)dy = 0,$ $y(0) = -1$

8. Solve $y'' - 4y' + 4y = 2e^{2x} + x + 2,$ $y(0) = 1,$ $y'(0) = 0$ (20%)