

國立屏東科技大學 103 學年度 碩士班暨碩士在職專班 招生考試
材料工程研究所碩士班甲組 工程數學試題

UNREGISTERED

1. Solve the ODE (using Exact DE). (20%)

$$(y^{-2} \sin 2x + y)dy = (2y^{-1} \cos 2x - x)dx$$

2. Solve the initial problem (20%)

$$y'' - 4y' = 0 \quad y(0) = 1, y'(0) = 2$$

3. $A = \begin{bmatrix} 3 & 2 & 1 \\ 3 & 2 & 1 \\ 6 & 4 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -1 & 0 \\ 1 & 0 & 1 \\ 1 & 3 & 2 \end{bmatrix}$ Find $1) AB$ (10%)

4. The matrix $A = \begin{bmatrix} 2 & 1 & -1 & 4 \\ 1 & 1 & 2 & 1 \\ -2 & -2 & 1 & 1 \\ 1 & 2 & 1 & 2 \end{bmatrix}$ Find the (a) determinant $|A|$ (12%) and (b)

Rank(A) (3%)

5. $A = \begin{bmatrix} 0 & 5 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$

(1) Find A^{-1} (10%)

(2) Find the eigenvalues (特徵值) and the corresponding eigenvectors (特徵向量) of A. (10%)

UNREGISTERED

6. Use the Laplace transform to find the solution. (15%)

$$y'' + y = e^t; \quad y(0) = 0, \quad y'(0) = 0$$