

國立勤益科技大學九十九學年度研究所碩士班招生筆試試題卷

所別： 電子工程系

組別：

科目： 工程數學

准考證號碼： (考生自填)

1. (20 分) Find general solution of $y'' + y' + y = x^4 + 4x^3 + 12x^2$.

2. (20 分) With respect to a right-handed Cartesian coordinate system, let $A=[2,3,-1]$, $B=[-3,4,4]$, and $C=[0,1,2]$.

Find (a) $A \cdot B \times C$, (b) $A \times (B \times C)$

3.(30 分) Let $A = \begin{bmatrix} 2 & 0 & 0 \\ 2 & 1 & 1 \\ 0 & 0 & 3 \end{bmatrix}$

(a) What is the rank of A .

(b) Find the eigenvalues and eigenvectors of A .

(c) Diagonalizes A .

4.(15 分) Let $\varphi(x, y, z) = 8xy^2 - xz$, and $u = \frac{1}{\sqrt{3}}[\bar{x} + \bar{y} + \bar{z}]$. Compute the directional derivative of the function

in the direction of u .

5.(15 分) Find $\mathcal{L}^{-1} \left[\frac{s+1}{s^3 + s^2 - 6s} \right]$