明志科技大學 102 學年度研究所碩士班一般考試暨在職專班招生命題用紙

所別：＿＿＿電子工程研究所＿＿＿ 組別：＿＿＿＿＊＊＊＿＿＿ 科目：＿＿＿工程數學＿＿＿

注意：■不准□一般□工程用計算器，考試時間總計：100 分鐘。試題共 1 頁，第 1 頁

1. Solve the differential equation. (15%)
$$4y^4 + 3\sin(x) + (16y^3 x - 3\sin(y))y' = 0$$

2. Solve the differential equation. (15%)
$$y'' + 3y' + 2y = e^{-x} + 6.$$

3. Use the Laplace transform to determine the response $y(t)$ of the system under a square wave where $u(t)$ is the unit step function or Heaviside function. (20%)
$$y' + 2y = u(t) - u(t-1), \; y(0) = 0.$$

4. Find the eigenvalues and corresponding eigenvectors of the following matrix. (15%)
$$\mathbf{A} = \begin{bmatrix} 2 & 0 & 0 \\ 2 & 0 & 1 \\ 0 & 0 & 3 \end{bmatrix}$$

5. Find the area if the vertices are $(2,1,3), (5,4,6), (7,8,9)$. (15%)

6. Find the Fourier transform of the function. (20%)
$$f(t) = e^{-3|t-2|}.$$