

國立屏東科技大學 九十三 學年度 碩士班暨碩士在職專班 招生考試
機械工程系碩士班 甲組
專業科目（一）工程數學 試題

1. The equation is given as

$$2 \sin y \, dx + \cos y \, dy = 0$$

(1) Find the integrating factor of the equation. (8%)

(2) Find the general solution of the equation. (7%)

2. $y'' - y = 3e^{2x}$ Find the general solution of the equation. (15%)

3. Obtain the particular solutions of the following problem. (15%)

$$x^2 y'' - 2xy' + 2y = 4 \quad ; \quad y(1) = y'(1) = 0$$

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

$$y'' + 4y' + 3y = \delta(t-2) \quad ; \quad y(0) = y'(0) = 0 \quad (\text{Note : } L[\delta(t-a)] = e^{-as})$$

5. For the partial differential equation

$$\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2} \quad ; \quad u(0,t) = u(2,t) = 0, \quad u(x,0) = 1.$$

Find the solution. (20%)

6. For the matrix A

$$A = \begin{bmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$$

Find the eigenvalues and the corresponding eigenvectors of A. (20%)