

國立彰化師範大學103學年度博士班招生考試試題

系所： 工業教育與技術學系 組別： 乙組

科目： 工程數學

☆☆請在答案紙上作答☆☆

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● 共 100 分每題配分置於題目後面

1. Solve the initial value problem of the following differential equation. (15%)

$$y''+4y=8x^2, \quad y(0)=-3, \quad y'(0)=0.$$

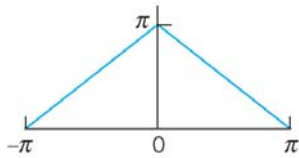
2. Solve for $w=w(x,y)$. (15%)

$$\frac{\partial^2 w}{\partial x \partial y} + \frac{\partial w}{\partial x} + x + y + 1 = 0; \quad w(0,0) = w_x(x,0) = w_y(0,y) = 0.$$

3. Using the Laplace transform to solve the initial value problem (15%)

$$y''+2y'-3y=0, \quad y(2)=-3, \quad y'(2)=-5.$$

4. Find the Fourier series of $f(x)$, which is assumed to have the period 2π . (15%)



5. Find the inverse of the following matrix A. (15%)

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

6. Find the eigenvalues, eigenvectors and diagonalization of the following matrix A. (25%)

$$A = \begin{bmatrix} 3 & 1 & 1 \\ 2 & 4 & 2 \\ -1 & -1 & 1 \end{bmatrix}$$