

國立嘉義大學 113 學年度  
電機工程學系碩士班招生考試試題

科目：工程數學（每題 25 分，共 100 分）

1. Solve the following system of equations using the method of Gauss-Jordan elimination.(25%)

$$x_1 + x_2 + 2x_3 + 6x_4 = 11$$

$$2x_1 + 3x_2 + 6x_3 + 19x_4 = 36$$

$$3x_2 + 4x_3 + 15x_4 = 28$$

$$x_1 - x_2 - x_3 - 6x_4 = -12$$

2. Solve the ODE:  $y'' + y = 2e^{ix}$

a. Find the homogeneous solution  $y_h$ (10%)

b. Find the solution of the ODE(15%)

3. Solve the ODE:  $x^2y'' - xy' + y' = \ln x$

a. Find the homogeneous solution  $y_h$ (10%)

b. Find the solution of the ODE(15%)

4. The following vectors form a basis for  $\mathbb{R}^3$ . Use these vectors in the Gram-Schmidt process to construct an orthonormal basis for  $\mathbb{R}^3$

$(1,1,1), (2,0,1), (2,4,5)$

(25%).