國立彰化師範大學 98 學年度<u>碩</u>士班招生考試試題

系所： 車輛科技研究所 科目： 工程數學

* 共五題、請依序作答、每題 20 分。

1. Find the general solution of $y'' - (3/x)y' + (4/x^2)y = 0$ for $x > 0$, given that one solution is $y_1(x) = x^2$.

2. Solve the initial value problem using Laplace transform.

$$y'' + y = t;\ y(0) = 1,\quad y'(0) = 0$$

3. One corner of a rectangular parallelepiped is at (-1, 2, 2) and three incident sides extend from this point to (0, 1, 1), (-4, 6, 8), and (-3, -2, 4). Please find the volume of this parallelepiped.

4. Solve the system as the following

$$x_1 - 3x_2 + x_3 - 7x_4 + 4x_5 = 0$$
$$x_1 + 2x_2 - 3x_3 = 0$$
$$x_2 - 4x_3 + x_5 = 0$$

5. Solve the system as the following

$$x_1' = 2x_1 - 2x_2 + 3x_3\quad ;\quad x_1(0) = 1$$
$$x_2' = x_1 + x_2 + x_3\quad ;\quad x_2(0) = 0$$
$$x_3' = x_1 + 3x_2 - x_3\quad ;\quad x_3(0) = 1/2$$