

大同大學 103 學年度(暑)轉學入學考試試題

考試科目:工程數學

所別:化學工程學系

第 1/1 頁

註:本次考試 不可以參考自己的書籍及筆記; 不可以使用字典; 不可以使用計算器。

1. (20%) $y''+8y'+12y=e^{-x}+7; y(0)=1, y'(0)=0$

2. (20%) Solve
$$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2} \quad \text{for } -\infty < x < \infty, t > 0$$
$$y(x, 0) = f(x), \frac{\partial y}{\partial t}(x, 0) = 0 \quad \text{for } -\infty < x < \infty.$$

3. (20%) Solve $y'+3y=2x, y(0)=3$ by Laplace transform method.

4. (20%) Solve $y'+3y=2x, y(0)=3$ by series solution method. Write the first five terms.

5. Suppose we want the temperature distribution $u(x,t)$ in a thin, homogeneous (constant density) bar of length L , given that the initial temperature in the bar at time zero in the cross section at x perpendicular to the x axis is $f(x)$. The two ends of the bar are maintained at temperature zero for all time. Write the PDE, the ICs and BCs for the problem. (5%) Solve the problem. (15%)