

國立中央大學101學年度碩士班考試入學試題卷

所別：土木工程學系碩士班 大地組(一般生) 科目：常微分方程式 共 1 頁 第 1 頁

本科考試可使用計算器，廠牌、功能不拘

*請在試卷答案卷(卡)內作答

- 1) Let $y(x)$ be a solution of the differential equation $y'' + \lambda y = 0$. Here λ is an unknown constant. The solution $y(x)$ satisfies the boundary conditions $y'(0) = y'(\pi) = 0$. Please find out $y(x)$. (30 points)
- 2) Let $y(x)$ be a solution of the differential equation $x^2 y'' + \frac{y}{4} = 0$. It satisfies the conditions $y(1) = 0$ and $y'(1) = 3$. Please find out $y(e^2)$. (30 points)
- 3) Let $y(t)$ be a solution of the differential equation $[e^{\cos y} - (t)(\sin y)] \frac{dy}{dt} = 1$. It satisfies the initial condition $y(0) = 0$. Please find out $y(t)$. ($y(t)$ could be an implicit solution.) (20 points)
- 4) Let $u(t)$ be a solution of the differential equation $2uu'' + 2(u')^2 + u^2 = 9$. It satisfies the initial conditions $u(0) = u'(0) = 0$. Please find out $u(\pi)$. (20 points)