

中國文化大學 九十五 學年度 第一學期 期中 考試試卷					
考試科目	任課老師	系級	考試日期	份數	備註
工程數學	陳為仁	機二 A	95/11/17	60	closed books

- Given the differential equation  $e^{x+y} y' = x$ .
  - Determine if the given differential equation is separable. (2)
  - Give the order and degree of the equation. (2)
  - Find the general solution. (8)
- Solve the following initial value problem. (10)
 
$$y' - y = 2e^{4x}; \quad y(0) = -3$$
- Given the differential equation  $(2x^2 + 3y^2)y' + (4xy + 2x) = 0$ .
  - Show that above equation is exact. (3)
  - Find a potential function and the general solution. (10)
- Given the following differential equation  $y - xy' = 0$ .
  - Show that the given differential equation is not exact. (3)
  - Find an integrating factor  $\mu(y)$  that is a function of  $y$  only. (5)
  - Find its general solution. (7)
- Find the general solution of the differential equation  $y' = \frac{x}{y} + \frac{y}{x}$ . (10)
- Given:  $y'' + 11y' + 24y = 0$ ;  $y(0) = 1$ ,  $y'(0) = 4$ ;  $y_1(x) = e^{-3x}$ ,  $y_2(x) = e^{-8x}$ .
  - Prove that  $y_1(x)$  and  $y_2(x)$  are solutions of the differential equation. (5)
  - Show that the Wroskian of  $y_1(x)$  and  $y_2(x)$  is not zero. (5)
  - Write the general solution  $y(x)$ . (5)
  - Find the solution of the initial value problem. (5)
- Given:  $y'' - 3y' + 2y = 10\sin x$ 
  - Find the general homogeneous solution  $y_h(x)$ . (6)
  - Find the particular solution  $y_p(x)$ . (10)
  - Find the general solution  $y(x)$ . (4)