

國立高雄應用科技大學
107 學年度研究所碩士班招生考試
電子工程系碩士班
微分方程(乙組)

試題 共 1 頁，第 1 頁

- 注意：a. 本試題共 3 大題，共 100 分
b. 作答時不必抄題，但須註明題號
c. 考生作答前請詳閱答案卷之考生注意事項

1. Solve the following ODEs.

(a) (10%) $\cos(x+y)dx + (3y^2 + 2y + \cos(x+y))dy = 0$

(b) (10%) $\frac{dy^5}{dx^5} - 3\frac{dy^4}{dx^4} + 3\frac{dy^3}{dx^3} - \frac{dy^2}{dx^2} = 0$

(c) (10%) $\frac{dy^2}{dx^2} + 2\frac{dy}{dx} + 3y = 0$

(d) (10%) $y'' + 2y' + y = 2x \sin x$

(e) (10%) $x^3 y''' - 3x^2 y'' + 6xy' - 6y = 0$

2. Solve the initial value problems.

(a) (15%) $y' = y^2 e^{-x}$; $y(1) = 4$, assume $y \neq 0$

(b) (15%) $y' + y \tan x = \sin x$; $y(0) = 1$

3. (a) (10%) Show the two functions $p(x) = x^2$, $q(x) = x^2 \ln x$ are linear independent ($x > 0$).

(b) (10%) If a second-order homogeneous linear ODE for which the given functions in (a) are solutions, solve the initial value problem for $y(1) = 4$, $y'(1) = 6$.