

國立聯合大學 106 學年度

寒假轉學生招生考試試題紙

科目： 工程數學 A 第一頁共二頁

1. Solve the following 1st-order differential equations.

a. (10%) $x \sin(y)y' = \cos(y)$

b. (10%) $e^y dx + (xe^y - 1)dy = 0, y(5) = 0$

c. (10%) $y' + (\tan x)y = \sec x$

d. (10%) $\frac{1}{e^{2x} + 1}y' + \frac{2}{e^{2x} + 1}y = e^{-x}$

2. Show that the following functions $y_1(x)$ and $y_2(x)$ are linear independent, and then find the corresponding homogeneous 2nd-order differential equation.

a. (10%) $y_1(x) = e^{-4x} \cos(4x), y_2(x) = e^{-4x} \sin(4x)$

b. (10%) $y_1(x) = x^3, y_2(x) = x^3 \ln x$

3. Please solve the following 2nd-order differential equations.

a. (10%) $y'' - 2y' - 3y = \sin^2 x$

b. (10%) $y'' - 3y' + 2y = \cos(e^{-x})$

c. (10%) $x^2 y'' - 2xy' + 2y = x^4 \cosh x$

d. (10%) $x^2 y'' - 4xy' + 6y = \ln x^2$