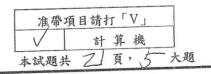# 淡江大學99學年度碩士班招生考試試題

系別：土木工程學系　　　　科目：工　程　數　學

1. Solve for the following 1st order differential equations. (20%)
   (a) $e^x \sin(y) - 2x + (e^x \cos(y)+1)y' = 0$
   (b) $2y^2 + ye^{xy} + (4xy + xe^{xy} +2y)y' = 0$

2. Solve for the following 2nd order differential equations (20%)
   (a) $x^2 y'' - 5xy' + 8y = 2\ln(x)$
   (b) $y'' - y' - 2y = e^{2x}$

3. Use the Laplace transform to solve for the initial value problem (20%)
   $y'' + 16y = 1+t$; $y(o)=-2$; $y'(o)=1$

4. Find the volume of the parallepiped whose incident sides extend from the first point to each of the other three. (20%)
   $(1,1,1)$; $(-4, 2,7)$、$(3,5,7)$、$(0, 1,6)$

5. Find the eigenvalues and their corresponding eigenvectors (20%)
   $$\begin{bmatrix} 2 & 0 & 0 \\ 1 & 0 & 2 \\ 0 & 0 & 3 \end{bmatrix}$$