

系別：電機工程學系  
資訊工程學系

三年級

科目：工程數學

本試題共 1 頁

一、  $y' = 3x^2 - \frac{y}{x}$  ;  $y(1) = 5$  (20%)

二、 Find the general solution of  $y'' + 4y = x + 2e^{-2x}$  (20%)

三、  $A = \begin{pmatrix} 1 & 1 & 2 & 1 \\ 4 & 1 & 6 & 2 \end{pmatrix}$  ,  $B = \begin{pmatrix} -1 & 8 \\ 2 & 1 \\ 1 & 1 \\ 12 & 6 \end{pmatrix}$

(a)  $A \cdot B = ?$

(20%)

(b)  $B \cdot A = ?$

四、 Let  $f(t) = \begin{cases} e^{at} & , t \geq 0 \\ e^{-at} & , t < 0 \end{cases}$  , where  $a < 0$

Find the Fourier transform of  $f(t)$ ? (20%)

五、  $f(z) = z \operatorname{Re}(z)$  ,  $\operatorname{Re}$ : real part

What is the region that  $f(z)$  is differentiable? (20%)