明志科技大學 104 學年度研究所碩士班一般考試暨在職專班招生命題用紙

所別：　　電子工程研究所　　　組別：　　　＊＊＊　　　科目：　　　工程數學　　　
注意：■不准□一般□工程用計算器，考試時間總計：100 分鐘。試題共 1 頁，第 1 頁

1. Solve the initial value problem. (20%)

$$y' = y^2 e^{-2x}; y(0) = 4$$

2. Solve the differential equation. (20%)

$$y'' + 2y' - 3y = 9e^{2x} + x$$

3. Use the Laplace transform to solve the initial value problem. (20%)

$$y'' + 4y' + 3y = e^{2t}; y(0) = 0, y'(0) = 1$$

4. Let

$$f(t) = e^{-|t|} \text{ for all real } t.$$

Find the Fourier transform of the function. (20%)

5. In the following problem, evaluate $\oint_C \mathbf{F} \cdot d\mathbf{R}$. $\mathbf{R}$ is position vector and the symbol $\oint_C$ means a line integral is taken around a closed path C of Figure 1. (20%)

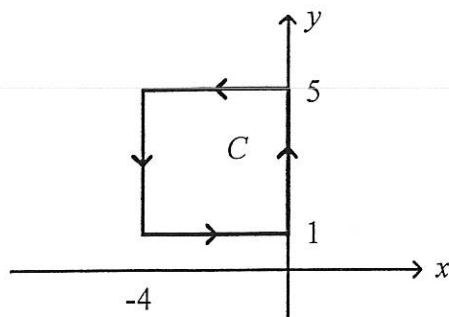$$\mathbf{F} = (y - x^2)\mathbf{i} + (2y - x)\mathbf{j}$$

Figure 1