

淡江大學九十一年度碩士班招生考試試題

系別：水資源及環境工程學系

科目：工程數學

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本試題共 / 頁

$$1. y' - \left(\frac{y^2}{x} + \frac{y}{x} - \frac{2}{x} \right) = 0 \quad (20\%)$$

Calculate y

$$2. y'' - \left(\frac{3}{x} \right) y' + \left(\frac{4}{x^2} \right) y = 0 \quad (20\%)$$

Calculate y

$$3. \text{ Evaluate the line integral of } \vec{G}(x, y, z) = x\vec{i} - y\vec{j} + z\vec{k} \text{ over the straight line segment from } (1, 1, 1) \text{ to } (-2, 1, 4). \quad (20\%)$$

4. A position vector $\vec{p}(t)$ is given,

$$\vec{p}(t) = [\cos t + t \sin t] \vec{i} + [\sin t - t \cos t] \vec{j} + t^2 \vec{k}, \quad t > 0$$

determine the normal component of the acceleration, the curvature, and the unit normal vector. (20%)

$$5. f(t) = \begin{cases} 3 & \text{if } 0 < t < \pi \\ 0 & \text{if } \pi < t < 2\pi \\ \sin t & \text{if } t > 2\pi \end{cases} \quad (20\%)$$

Calculate $\mathcal{L}(f(t))$