銘傳大學 99 學年度轉學生招生考試

生物醫學工程學系、電子工程學系

第三節

工程數學試題

（第 1 頁共 1 頁）（限用答案本作答）　　□可使用計算機 ☑不可使用計算機

1. Solve $\frac{dy}{dx} = 3y,\ y(x) = ?$ (10%)
2. Solve $y' = \frac{y}{2x} - \frac{x}{2y}$ (10%)
3. Solve $y'' + y' - 2y = 0,\quad y(0) = 4,\ y'(0) = -5$ (10%)
4. Solve $y'' + 4y = x + 2e^{-2x}$, general solution $y(x) = ?$ (10%)
5. Find the inverse transform of (a) $\frac{1}{s(s^2 + w^2)}$ (5%) and (b) $\frac{1}{s^2 + 3s + 2}$ (5%)
6. If $L\{f(t)\}$=F(s), $L\{g(t)\}$=G(s), where $L(\cdot)$ denotes the Laplace transform, find the Laplace transform of the integral $\int_0^t f(\tau)g(t-\tau)d\tau$. (10%)
7. Solve the following ODE with Laplace Transform (10%)
   $y'' + y' + 9y = 0,\ y(0) = 0.16,\ y'(0) = 0$
8. Find the Fourier Series of the function (20%)
   $$f(t) = \begin{cases} -k & -2 < t < 0 \\ k & 0 < t < 2 \end{cases}, \quad f(t+4) = f(t)$$
9. Find the Fourier Transform of the following functions (a) impulse function $\delta(t)$ (5%) (b) unit step function $u_s(t)$ (5%)

試題完