國立中央大學100學年度碩士班考試入學試題卷

所別：土木工程學系碩士班 大地組(一般生)　科目：常微分方程式　共 1 頁 第 1 頁

本科考試可使用計算器，廠牌、功能不拘

＊請在試卷答案卷（卡）內作答

(1) A particular solution $y(t)$ of the differential equation $\frac{d^2y}{dt^2}+y=\frac{(\sin t)^2+(\cos t-1)^2-1}{\cos t}$ satisfies the initial conditions $y(0)=-2$ and $\frac{dy}{dt}(0)=0$. That is, $y=-2$ and $\frac{dy}{dt}=0$ at the initial time $t=0$. Please compute $y(\pi)$, the value of $y(t)$ at the time $t=\pi$. (25%)

(2) Please find out the general solution of the differential equation $\frac{d^6y}{dt^6}+30\frac{d^4y}{dt^4}+129\frac{d^2y}{dt^2}+100y=0$. (25%)

(3) The inverse Laplace transform of $F(s)=\frac{e^{-3s}}{s^2+2s+2}$ can be denoted as $f(t)=\mathcal{L}^{-1}\{F(s)\}$. Please find out the expression of $f(t)$. (25%)

(4) A particular solution $y(t)$ of the differential equation $\frac{dy(t)}{dt}-(\tan t)y(t)=\cos(\sin t)$ satisfies the initial condition $y(0)=0$. Please find out the expression of $y(t)$. The term $\cos(\sin t)$ in the above equation can also be expressed as $\cos(\theta)$ with $\theta=\sin t$. (25%)