國立臺北科技大學九十四學年度學士班轉學考試

化工系　　工程數學試題

填准考證號碼

> **注意事項：**
> 1. 本試題共 7 題，共 100 分。
> 2. 請按順序標明題號作答，不必抄題。
> 3. 全部答案均須答在試卷答案欄內，否則不予計分。

1. Solve the differential equation (15 points)

   $y'' + y = \sec x$

2. Solve the differential equation by the Frobenius Method (15 points)

   $xy'' + 2y' + 4xy = 0$

3. Find the inverse Laplace transform (20 points)

   (a) $\ln \dfrac{S+a}{S+b}$　　　　　　b) $\dfrac{S}{(S^2 - 9)^2}$

4. Solve the differential Equation by the Laplace transform (15 points)

   $y'' + y = 2\cos t, \quad y(0) = 3, \quad y'(0) = 4$

5. Find the unit normal vector for the given curve at the given point (10 points)

   $y = 1 - x^2, \; P:(1,0)$

6. Evaluate the following integration (10 points)

   $\displaystyle\int_{0}^{\pi/4} \int_{\sin x}^{\cos x} xy\,dy\,dx$

7. Solve the following differential equation (15 points)

   $2y^{-1}\cos 2x\,dx = y^{-2}\sin 2x\,dy, \; y(\pi/4) = 3.8$