國立澎湖科技大學
九十八學年度研究所入學考試試題

科目：工程數學

－作答注意事項－

考試時間：100 分鐘

作答方式：請用黑色或藍色筆在「答案卷」上作答

祝考試順利

科目：工程數學

1、Solve   (a) $\cos(x+y)dx+(y+\cos(x+y))dy=0$,   (b) $y'+x^{-1}y=xy^2$.   (20%)

2、Solve $y''-2y'-3y=4e^x$.   (15%)

3、Using the Laplace transform, solve the following differential equations.

   $y''+3y'+2y=e^{-3t}$, $y(0)=1$, $y'(0)=-1$ （20%）

4、Find the Fourier series of the periodic function $f(t)=\begin{cases}-1, & -\pi<t\le 0 \\ 1, & 0<t\le\pi\end{cases}$ and its

   period $T=2\pi$.   (15%)

5、Let $A=\begin{bmatrix}1 & 0 & 0 \\ 2 & 4 & 0 \\ 6 & 4 & 2\end{bmatrix}$.   Find the eigenvalues and eigenvectors of matrix A. (12%)

6、If $\vec{v}=2y\cdot\cos x\,\hat{i}+4y^2\cdot z\,\hat{j}+e^{3x}\cdot\sin z\,\hat{k}$, then find $\nabla\times\vec{v}$.   (8%)

7、Find the value of the line integral when $\vec{F}(\vec{r})=-y\,\hat{i}+x\,y\hat{j}$ and C is the circle arc

   as $\vec{r}(t)=\cos t\,\hat{i}+\sin t\,\hat{j}$ form $t=0$ to $t=\dfrac{\pi}{2}$.   (10%)