诚信应考,考试作弊将带来严重后果!

华南理工大学期末考试

《 Calculus A》试卷

注意事项：1. 考前请将密封线内填写清楚；
2. 所有答案请直接答在试卷上(或答题纸上)；
3. 考试形式：闭卷；
4. 本试卷共 8 大题，满分 100 分， 考试时间 120 分钟。

题 号	1	2	3, 4	5, 6	7, 8	总分
得 分						
评卷人						

座位号 专业 学院 学号 姓名 密 封 线 (密 封 线 内 不 答 题)

1. Answer the questions (20):

(1) The series as absolutely convergent, conditionally convergent or divergent series

$$\sum_{n=1}^{\infty}(1-\frac{1}{5n})^n$$

Answer ----------

(2) Evaluate line integral $\int_{(0,0,0)}^{(1,2,1)}(yz-e^{-x})dx+(xz+e^{y})dy+xydz$

Answer ----------

(3) Let G be the sphere $x^2+y^2+z^2=a^2$. Evaluate the following surface integral

$$\iint_G zdS$$

Answer ----------

(4) Solve differential equation $y''''-y=0$

Answer ----------

(5) In what direction u does $f(x,y)=1-x^2-y^2$ decrease most rapidly at $p=(-1,2)$

Answer ----------

2. Evaluate the problems (30):

(1) Solve differential equation $y''-3y'+2y=\sin^3 x$

(2) Find the convergence set for the power series

$$\sum_{n=0}^{\infty}\frac{(x-3)^n}{2^n+1}$$

(3) Find the curvature for the helix $\vec{r}(t)=(a\cos t)\vec{i}+(a\sin t)\vec{j}+ct\vec{k}$

(4) Find maximum and minimum values $f(x,y)=10+x+y;\quad S=\{(x,y):x^2+y^2\le 9\}$.

(5) Evaluate $\iint_S \frac{1}{1+x^2+y^2}dxdy$ .where S is the first quadrant sector of the circle $x^2+y^2=1$ between $y=0$ and $y=x$

3. (10) Evaluate the flux of $\vec{F}$ across G. Where $\mathbf{F} = x\mathbf{i} + y\mathbf{j} + z\mathbf{k}$, G is the surface above x, y plane determined by $z = 1 - x^2 - y^2 \quad -\infty < x < +\infty, \ -\infty < y < +\infty,$ and the normal direction upward

4. (10) Calculate $\oint_C (x^2 + 4xy)dx + \left(2x^2 + 3y\right)dy$. C is the ellipse $9x^2 + 16y^2 = 144$

5. Evaluate $\oint_C \vec{F} \cdot \vec{T}\, ds$. where $\vec{F}(x, y, z) = \left(y - x\right)\vec{i} + (x - z)\vec{j} + (x - y)\vec{k}$ and C is the

boundary the plane $x+2y+z=2$ in the first octant, oriented clockwise as viewed from above.

6. (7) Find the minimum distance from the origin to the line of intersection of the two planes

$$x+y+z=8,\ 2x-y+3z=28$$

7. (8) Evaluate the $\iint_{\partial S} \vec{F}\cdot\vec{n}\,dS$. Where $\vec{F}(x,y,z)=(x+z^2)\vec{i}+(y-z^2)\vec{j}+x\vec{k}$.

S is the solid bounded by $0\le y^2+z^2\le 1,\quad 0\le x\le 2$.

8. (5) Evaluate $\int_0^2 \int_0^{\sqrt{4-x^2}} \int_0^{\sqrt{4-x^2-y^2}} z\sqrt{4-x^2-y^2}\,dzdydx$