学院：________ 专业：________ 学号：________ 姓名：________

装 订 线

广东工业大学考试试卷（ 模拟卷 ）

课程名称: Advanced Mathematics A(2)　　试卷满分 100 分

考试时间:June 4, 2020 （14th Week Thursday ）

考试形式: Open-book exam （开闭卷）

题　号	一	二	三	四	五	六	七	八	九	十	总分
评卷得分											
评卷签名											
复核得分											
复核签名											

Please answer in English or Bilingualism!

Directions: There are 10 questions in this part. Evaluate the following questions and write steps: (10×10 = 100 points)

(1) Find symmetric equation for the line that passes through $(3,-1,6)$ and is parallel to both of the planes $x-2y+z=2$ and $2x+y-3z=5$.

(2) Evaluate the triple integral $\iiint\limits_{\Omega} z\,dxdydz$, where the closed set Ω is bounded by $z=x^2+y^2$ and $z=4$.

(3) Use Green's Theorem to evaluate the line integral $\oint_C \frac{xdy-ydx}{x^2+y^2}$, where C is the boundary of the square with vertices $A(1,0), B(0,1), C(-1,0)$, and $D(0,-1)$ with the anti-clockwise direction.

(4) Evaluate $\iint_G xyzdS$, where G is the portion of the cone $z^2=x^2+y^2$ between the planes $z=1$ and $z=4$.

(5) Does $\sum_{n=1}^{\infty}\frac{n^2}{3^n}$ converge or diverge? Give your reason.

(6) Find the first order and second order partial derivatives of the implicit function z determined by the equation $x^2-2y^2+z^2-4x+2z-5=0$.

(7) Use Gauss's Divergence Theorem to calculate $\iint_{\partial S} \vec{F} \cdot \vec{n}\, dS$, where $\vec{F}(x, y, z) = z\vec{i} + x\vec{j} + y\vec{k}$; S is the hemisphere $0 \le z \le \sqrt{9 - x^2 - y^2}$ with outward orientation $\vec{n}$.

(8) What are the dimensions of the rectangular box, open at the top, that has maximum volume when the surface area is 48?

(9) Compute the double integral

$$I = \iint_D |y - x^2| d\sigma$$

a) D= $\{(x, y)|0 \le x \le 1, 0 \le y \le 1\}$ (6 points)

b) D= $\{(x, y)| -1 \le x \le 1, 0 \le y \le 1\}$ (4 points)

(10) Discuss the convergence or divergence of the following series. If a series converges, is it absolutely convergent or conditionally convergent?

$$a) \sum_{n=1}^{\infty} (-1)^{n-1} \frac{\sqrt{n}}{n+1} \qquad b) \sum_{n=1}^{n} \frac{n}{2^n} \cos\frac{n\pi}{3}$$