试卷编号：______

诚信考试，诚信做人。

学院：______ 专业：______ 班级______ 学号：______ 姓名：______

装 订 线

广东工业大学考试试卷（ A）

2019 -- 2020 学年度第 2 学期

课程名称： Advanced Mathematics A(2) 学分 5.5 试卷满分 100 分

考试时间：June 21,2020（16th Week Sunday ）考试形式：Open exam

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 CHINESE or in ENGLISH or Bilingualism!

1、Fill the correct answer in the blanks (4 points each, 16 points in all)

(1) If $a=i-2j+2k$ and $b=i+j+k$， then $a\times \mathrm{b}=$________.

(2) Let $xz+xy^2+yz=3$, then $\frac{\partial z}{\partial x}=$________.

(3)Let $u=xy^2+z^3-xyz$ at the point (1,1,2) in the direction ℓ(where $60^\circ,45^\circ,60^\circ$ are the direction angle of ℓ), then the directional derivative of $\frac{\partial u}{\partial \ell}\Big|_{(1,1,2)}=$________.

(4) Find the double limits of $\lim\limits_{(x,y)\to(0,0)}(x+y)\sin(\frac{1}{x^2+y^2})=$________.

2．**Multiple choice (3 points each, 12 points in all)**

(1)The radius of convergence of the power series $\sum\limits_{n=1}^{\infty} nx^n$ is (   ).

(A) 2　　(B) 3　　(C) 1　　(D) 4

(2) Let $z = xy + \frac{x}{y}$, then $\frac{\partial z}{\partial y}\Big|_{(1.1)}$ = (　　).

(A) $\frac{1}{2}$　　(B) $\frac{1}{3}$　　(C) $-\frac{1}{2}$　　(D) $-\frac{1}{3}$

(3) By Green's formula, evaluate the line integral of

$I = \oint_{(C)} x^2 y dx - xy^2 dy$ =(　　), where (C) is the circle $x^2 + y^2 = R^2$ with the positive direction.

(A) $\frac{1}{2}$　　(B) $\frac{\pi}{4}R^4$　　(C) $-\frac{\pi}{4}R^4$　　(D) 0

(4) Let $f(x, y, z) = x^2 + 2y^2 + 3z^2 + xy + 3x - 2y - 6z,$

then $\operatorname{grad} f(0,0,0)$ is (　　).

(A) $(3,-2,-6)$　　(B) $(6,3,0)$　　(C) $(3,2,6)$　　(D) $(-3,-2,6)$

3、**Directions: There are 7 questions in this part. Evaluate the following questions and write steps: (72 points in all)**

(1) **(10 points)** Find an equation of the plane that passes through $(2,-3,5)$ and is parallel to the plane $3x + 5y - 7z = 11$

(2) **(10 points)** Find the radius of convergence, convergence interval and convergence domain of the power series $\sum_{n=1}^{\infty}\frac{(-1)^n}{n}\left(\frac{1}{1+x}\right)^n$.

(3) **(10 points)** Suppose that $z=\sin(u+v)$, $u=xy$, $v=x^2+y^2$. Find $\frac{\partial z}{\partial x},\frac{\partial z}{\partial y}$.

(4) **(10 points)** Find the maximum and minimum of the function

$$f(x,y)=(x-1)^2+(y-2)^2+1$$

in the region $D=\{(x,y)\,|\,x^2+y^2\le 20\}$.

(5) **(10 points)** Le t $x^2-2y^2+z^2-4x+2z-5=0,$ Find $\dfrac{\partial z}{\partial x},\dfrac{\partial z}{\partial y}$

(6) **(10 points)** Evaluate the double integral $\iint\limits_{D} \frac{\sin(x+1)}{x} d\sigma$, where the domain of integration D is bounded by the line $y = x$ and the parabola $y = x^2$

(7)**(12 points)** Evaluate the triple $\iiint\limits_{(\Omega)} y dv,$ where the domain of integration (Ω) is bounded by $y = -\sqrt{1-x^2-z^2}$, $x^2+z^2=1$ and $y=1$.