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## 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	-	 三	四	五.	六	七	八	九	+	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  $a \times b =$ \_\_\_\_.

(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  $\ell$  (where  $60^\circ, 45^\circ, 60^\circ$  are the direction angle of  $\ell$ ), then the directional derivative of  $\frac{\partial u}{\partial \ell}\Big|_{(1,1,2)} = \underline{\hspace{1cm}}$ .

- (4) Find the double limits of  $\lim_{(x,y)\to(0,0)} (x+y)\sin(\frac{1}{x^2+y^2}) = \underline{\hspace{1cm}}$ .
- 2. Multiple choice (3 points each, 12 points in all)
- (1) The radius of convergence of the power series  $\sum_{n=1}^{\infty} nx^n$  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

$$I = \oint_{(C)} x^2 y dx - xy^2 dy = (0), \text{ where } (C) \text{ is the circle } x^2 + y^2 = R^2 \text{ with}$$

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 gradf(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  $\sum_{n=1}^{\infty} \frac{(-1)^n}{n} \left(\frac{1}{1+x}\right)^n.$ 

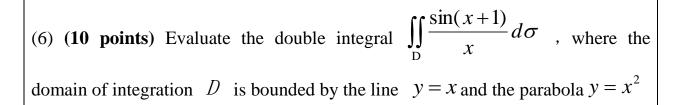
(3) (10 points) Suppose that  $z = \sin(u+v)$ , u = xy,  $v = x^2 + y^2$ . Find  $\frac{\partial z}{\partial x}$ ,  $\frac{\partial z}{\partial y}$ .

(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) Let 
$$x^2 - 2y^2 + z^2 - 4x + 2z - 5 = 0$$
, Find  $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$ 



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