学号________ 姓名________ 年级________ 专业________ 学院________

密 封 线

西南大学计算机与信息科学学院

《 高等数学 IB 》课程试题 【B】卷

2020～2021 学年 第 2 学期							期末考试		
考试时间	120 分钟	考核方式	闭卷笔试	学生类别			本科	人数	
适用专业或科类		计信院计科、软件工程、自动化专业					年级	2020 级	
题号	一	二	三	四	五	六	七	八	九	合计
得分										
签名										

阅卷须知：阅卷用红色墨水笔书写，得分用阿拉伯数字写在每小题题号前，用正分表示，不得分则在题号前写 0；大题得分登录在对应的分数框内；统一命题的课程应集体阅卷，流水作业；阅卷后要进行复核，发现漏评、漏记或总分统计错误应及时更正；对评定分数或统分记录进行修改时，修改人必须签名。

特别提醒：学生必须遵守课程考核纪律，违规者将受到严肃处

PLEASE ANSWER IN CHINESE OR IN ENGLISH OR BILINGUALISM!!

1. Fill the correct answer in the blanks (3 points each，15 points in all)

(1) The solution to the differential equation $\frac{\mathrm{d}y}{\mathrm{d}x}+2y=3, y(0)=1$ is y=____________.

(2) If a plane through (1, -1, 3) parallel to the plane 3x + y + z = 7, then the equation of the plan is __________________.

(3) If $z=xe^{y}+ye^{x}+2\ln x$, then $\frac{\partial z}{\partial x}=$_________________.

(4) The length of the curve segment is $\vec{r}(t)=(2+t)\vec{i}-(t+1)\vec{j}+t\vec{k}, 0\le t\le 3$ is ________.

(5) The sum of the series $\sum_{n=0}^{\infty}\left(\frac{1-x}{2}\right)^{2n}, -1<x<3$ is________________.

2. Choose the corresponding letter of the best answer that best completes the statement or answers the question among A, B, C, and D, and fill in the blanks (3 points each，15 points in all).

(1) Which of the series absolutely converges (   )

(A) $\sum_{n=1}^{\infty}\left(\frac{(-1)^n}{n}-\frac{1}{n+1}\right)$ (B) $\sum_{n=1}^{\infty}\left(\frac{\ln(n)}{n}\right)$

(C) $\sum_{n=1}^{\infty}\left((-1)^n\frac{n+2}{n^2\sqrt{n}}\right)$ (D) $\sum_{n=1}^{\infty}\left(\frac{\cos(n\pi)}{n}\right)$

(2) Which of the following is the angle between the plane $x=1$ and the plane $2x-2\sqrt{2}y-2z=5$. (   )

(A) $\frac{\pi}{3}$ (B) $\frac{2\pi}{3}$ (C) $\frac{\pi}{6}$ (D) $\frac{5\pi}{6}$

(3) Please choose the correct one. (   )

(A) $\lim_{(x,y)\to(0,0)}\frac{xy}{x^2+y^2}=0$ (B) $\lim_{(x,y)\to(0,0)}\frac{xy^2}{x^2+y^2}=0$

(C) $\lim_{(x,y)\to(0,0)}\frac{\cos(xy)}{x^2+y^2}=0$ (D) $\lim_{(x,y)\to(0,0)}\frac{\sin(xy)}{x^2+y^2}=0$

(4) Which of the following is the parametric equation for the line tangent to the curve $\begin{cases}x+y^2+2z=5\\x+z=1\end{cases}$ at the point (1,2,0). (   )

(A) $x=t+1, y=4t+2, z=2t$ (B) $x=t+1, y=2, z=t$

(C) $x=t+1, y=4t+2, z=-4t$ (D) $x=4t+1, y=t+2, z=-4t$

(5) Which of the following is an iterated integral for the double integration $\iint_R (x\sin y)dxdy, R: 0\le x\le\pi, 0\le y\le x$? (   )

(A) $\int_0^{\pi}\int_0^{x}(x\sin y)dydx$ (B) $\int_0^{x}\int_0^{\pi}(x\sin y)dydx$

(C) $\int_0^{\pi}\int_0^{y}(x\sin y)dxdy$ (D) $\int_0^{x}\int_0^{\pi}(x\sin y)dxdy$

3. **Find the solutions for following problems by computing (8 points each，40 points in all)**

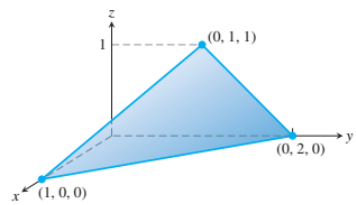
(1) Show that the limit $\lim\limits_{(x,y)\to(1,1)} \dfrac{xy^2-1}{y-1}$ do not exists.

(2) Find the total differential of the function $f(x,y,z)=x^2\sin y+y^z+e^{xz}$.

(3) Sketch the region of integration $\int_0^{2\sqrt{\ln 3}}\int_{\frac{y}{2}}^{\sqrt{\ln 3}} e^{x^2}\,dxdy$, reverse the order of integration, and evaluate the integral.

(4) Calculate $\int_C (2xy+z)ds$, where $C:\vec{r}(t)=t\vec{i}+t\vec{j}+t\vec{k}, 1\le t\le 3.$

(5) Evaluate $\iint_S y d\sigma$ over the triangular surface with vertices (1, 0, 0), (0, 2, 0), and (0, 1, 1).



4. Solve the following comprehensive problems (10 points each，30 points in all)

(1) You are to construct an open rectangular box from 12 m^2 of material. What dimensions will result in a box of maximum volume?

(2) Find the sum for $\sum_{n=0}^{\infty}(-1)^n\frac{(x-1)^{2n+1}}{2n+1}, 0<x<2$

(3) Find the counterclockwise circulation and the outward flux of the field $\vec{F} = xy\vec{i} + y^2\vec{j}$ around and over the boundary of the region enclosed by the curves $y = x^2$, $y = x$ in the first quadrant.