2018학년도 2학기
기초자연과학영역 학점취득특별시험 안내

II. 미분적분학2

1. 교재 : Calculus: Early Transcendentals, 8th edition-Sungkyunkwan University Version

성균관대학교 미분적분학 교재

저자 : James Stewart

출판사 : Cengage

2. 시험 범위 : 11장 Vectors and the Geometry of Space (1-6절)
12장 Vector Functions (1-3절)
13장 Partial Derivatives (1-8절)
14장 Multiple Integrals (1-9절)
15장 Vector Calculus (1-9절)

3. 출제경향

1) 시험문제 : 14-15문항(영문), 객관식(60-70%), 주관식(30-40%)

2) 답안은 국문으로 작성 가능함

4. 기출 문제 및 모범 답안

1. Find a vector perpendicular to the plane through the points $A(1,0,0), B(2,0,1)$, and $C(1,2,1)$.
(1) $<1,0,-1>$ (2) $<2,1,-2>$ (3) $<2,-1,1>$ (4) $<1,-1,2>$
Answer: (2)

2. Find the length of the arc of the curve given by the vector equation $r(t)=<t^3,2t,\sqrt{3}t^2>$ from the point (0,0,0) to the point (1,2,1).
(1) 1 (2) 2 (3) 3 (4) 4
Answer: (3)

3. If $f(x,y)=x^3y+y\cos y+x\tan y$, find $f_y(0,\pi)$.
(1) -1 (2) 0 (3) 1 (4) 2
Answer: (1)

4. If $f(x,y,z)=x\cos(yz)$, find the directional derivative of f at $(1,2,0)$ in the direction of the vector $<2,1,-2>$.

(1) $\frac{1}{2}$ (2) $\frac{2}{3}$ (3) -1 (4) 2

Answer: (2)

5. Find the volume of the solid bounded by the plane $z=0$ and the paraboloid $z=4-x^2-y^2$.

(1) 2π (2) 4π (3) 6π (4) 8π

Answer: (4)

6. Evaluate $\iiint_{\{(x,y,z):x^2+y^2+z^2\le 1\}} 3e^{(x^2+y^2+z^2)^{\frac{3}{2}}}dV$.

(1) $4\pi(e-1)$ (2) $3\pi(e-1)$ (3) $4(\pi-1)e$ (4) $3(\pi-1)e$

Answer: (1)

7. Evaluate $\int_C F\cdot dr$, where $F(x,y,z)=<zx,yz,xy>$ and C is the curve given by $x=t$, $y=t^2$, $z=t^3$, $0\le t\le 1$.

(1) $\frac{102}{97}$ (2) $\frac{207}{210}$ (3) $\frac{305}{301}$ (4) $\frac{409}{401}$

Answer: (2)

8. Evaluate $\oint_C (3y-e^{\sin x})dx+(7x+\sqrt{y^4+1})dy$, where C is the circle $x^2+y^2=16$.

(1) 16π (2) 32π (3) 64π (4) 128π

Answer: (3)

9. Find the tangent plane to the surface with parametric equations $x=u^2$, $y=v^2$, $z=2u+v$ at the point $(1,1,3)$.

(1) $x+2y-z+1=0$ (2) $2x-y+z+2=0$ (3) $x-2y+3z+3=0$ (4) $2x+y-2z+3=0$

Answer: (4)

10. Show that $\lim_{(x,y)\to(0,0)} \frac{x^2-2y^2}{x^2+2y^2}$ does not exist.

11. Find the absolute maximum and minimum values of the function $f(x,y)=x^2-2xy+2y$ on the rectangle $D=\{(x,y):0\le x\le 2, 0\le y\le 3\}$.

12. Determine whether or not the vector field $F(x,y)=<y+x,y-x>$ is conservative.

13. Find the area of the part of the paraboloid $z=x^2+y^2$ that lies under the plane $z=4$.

14. Use Stokes' Theorem to compute the integral $\iint_S curl F\cdot dS$, where $F(x,y,z)=<xz,yz,xy>$ and S is the part of the sphere $x^2+y^2+z^2=5$ that lies inside the cylinder $x^2+y^2=1$ and above the xy-plane.