SRM INSTITUTE OF SCIENCE AND TECHNOLOGY RAMAPURAM CAMPUS DEPARTMENT OF MATHEMATICS SURPRISE TEST – 2

* Required

Answer ALL Questions

Each question carries ONE mark.

1. *

If $z = x^2 + y^2 + 3xy$ then $\frac{\partial z}{\partial x} =$

(A) 2y + 3x (B) 3y (C) 2x + 3y (D) 2x

- [ ] A
- [ ] B
- [x] C
- [ ] D

2. *

If u is a homogeneous function of degree n then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=$

(A) n (B) nu (C) u (D) n^2u

- A
- B
- C
- D

3. *

$u=\sin^{-1}\left(\frac{x^2+y^2}{x-y}\right)$ is a homogeneous function of degree

(A) 2 (B) 3 (C) 1 (D) 4

- A
- B
- C
- D

4. *

The stationary point of $f(x,y)=x^2+y^2+6x+12$ is

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

- (●) A
- ( ) B
- ( ) C
- ( ) D

5. *

A point at which there is no extreme value is called _____.

(A) maximum point (B) minimum point
(C) saddle point (D) dual point

- ( ) A
- ( ) B
- (●) C
- ( ) D

6. *

If $r = f_{xx}$, $s = f_{xy}$, $t = f_{yy}$ then the condition for a function f(x, y) to have a maximum value is

(A) $rt - s^2 > 0, r > 0$ or $t > 0$ (B) $rt - s^2 < 0$

(C) $rt - s^2 > 0, r < 0$ or $t < 0$ (D) $rt - s^2 = 0, r > 0$

- [ ] A
- [ ] B
- [x] C
- [ ] D

7. *

If f(x, y) is an implicit function then $\frac{dy}{dx} =$

(A) $-\frac{\left(\frac{\partial f}{\partial x}\right)}{\left(\frac{\partial f}{\partial y}\right)}$ (B) $\frac{\left(\frac{\partial f}{\partial x}\right)}{\left(\frac{\partial f}{\partial y}\right)}$ (C) $\frac{\left(\frac{\partial f}{\partial y}\right)}{\left(\frac{\partial f}{\partial x}\right)}$ (D) $-\frac{\left(\frac{\partial f}{\partial y}\right)}{\left(\frac{\partial f}{\partial x}\right)}$

- [x] A
- [ ] B
- [ ] C
- [ ] D

8. *

If $f(x,y)=e^x \cos y$ then $f_{xy}(0,0) =$

(A) 0 (B) -1 (C) 2 (D) 1

- (○) A
- (◉) B
- (○) C
- (○) D

9. *

If $J_1 = J\left(\frac{x,y}{u,v}\right)$ and $J_2 = J\left(\frac{u,v}{x,y}\right)$ then $J_1 J_2 =$

(A) 0 (B) -1 (C) 2 (D) 1

- (○) A
- (○) B
- (○) C
- (◉) D

10. *

If $x = r\cos\theta$ *and* $y = r\sin\theta$ then $\frac{\partial(x,y)}{\partial(r,\theta)} =$
(A) r (B) r^2 (C) 2r (D) 1/r

- (●) A
- ( ) B
- ( ) C
- ( ) D

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