QUESTION BANK (OBJECTIVE TYPE)

MA1001-CALCULUS AND SOLID GEOMETRY

UNIT-II-FUNCTIONS OF SEVERAL VARIABLES

1. If Z= $x^2 + y^2+3xy$ then what is $\frac{\partial z}{\partial x}$?

(i) 2y+3x (ii) 3y (iii) 2x+3y (iv) 2x

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

(i) 2 (ii) 3 (iii) 1 (iv) 4

3.If u=ax^2+2hxy+by^2 then using Euler's theorem find x$\frac{\partial u}{\partial x}$ + y$\frac{\partial u}{\partial y}$ = ?

(i) u (ii) 2u (iii) 3u (iv) n(n-1)

4. If f(x , y) = e^{xy} then what is $f_{yyy}(1 , 1)$?

(i)-e (ii)$\frac{1}{e}$ (iii)e (iv)-$\frac{1}{e}$

5. if z= log (x^2+xy+y^2) then what is x$\frac{\partial z}{\partial x}$ +y$\frac{\partial z}{\partial y}$ =?

(i) 1 (ii) $\frac{2x+y}{x^2+xy+y^2}$ (iii) 2 (iv)$\frac{x+2y}{x^2+xy+y^2}$

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

(i)$-\frac{(\partial f/\partial x)}{(\partial f/\partial y)}$ (ii) $\frac{(\partial f/\partial x)}{(\partial f/\partial y)}$ (iii)$\frac{(\partial f/\partial y)}{(\partial f/\partial x)}$ (iv)$-\frac{(\partial f/\partial y)}{(\partial f/\partial x)}$

7. If f(x , y) = $e^x\, cosy\, then\, what\, is\, f_{xy}\,(0,0)$?

(i) 1 (ii) -1 (iii) 0 (iv) 2

8. If f (x , y) = cosxcosy then f_{yy} (0, 0)=?

(i) 1 (ii) 0 (iii) -1 (iv)$1/2$

9. If f (x , y) = $\tan^{-1}\left(y/x\right)$ then f_x (1 , 1) is

(i) $\frac{\pi}{4}$ (ii) ½ (iii) – ½ (iv) 0

10. If rt - $s^2 < 0$ at (a , b) then the point is

(i) Maximum point (ii) minimum point (iii) saddle point (iv) none of these

11. The stationary points of $x^2 + y^2 + 6x + 12$ are

(i) (-3 , 0) (ii) (0 , 3) (iii) (0 , -3) (iv) (3 , 0)

12. If x=$u^2 - v^2$ and y=2uv then J$\left(\frac{x,y}{u,v}\right)$ is

(i) $u^2 + v^2$ (ii) $2(u^2 + v^2)$ (iii) $4(u^2 + v^2)$ (iv) $4v^2$

13. If x=rcos θ and y=rsin θ Then what is $\frac{\partial(x,y)}{\partial(r,\theta)}$= ?

(i) r^2 (ii) r (iii) 2r (iv) 0

14. If v= $\tan^{-1} x$+$\tan^{-1} y$ then $\frac{\partial v}{\partial x}$ is

(i) 1+y^2 (ii) $\frac{1}{1+y^2}$ (iii) $\frac{1}{1+x^2}$ (iv) 1+x^2

15.u and v are functionally dependent if their jacobian value is

(i)zero (ii)one (iii)non-zero (iv)greater than zero

16.if $J_1 = J\left(\frac{x,y}{u,v}\right)$ and J_2=$J\left(\frac{u,v}{x,y}\right)$ then J_1J_2=?

(i)0 (ii)1 (iii)-1 (iv)2

17.The stationary points of f(x,y)=$sinx + siny + \sin(x+y)$ are

(i)$\left(\frac{\pi}{2},\frac{\pi}{3}\right)$ (ii)$\left(\frac{\pi}{3},\frac{\pi}{3}\right)$ (iii) $\left(\frac{\pi}{3},\frac{\pi}{2}\right)$ (iv) $\left(\frac{\pi}{2},\frac{\pi}{2}\right)$

18.The point (0,0) for f(x, y)=$x^3 + y^3 - 3axy$ is

(i)a maximum point (ii) a minimum point (iii)a saddle point (iv)none of these

19.If f(x, y)=$x^2 + y^2$ where x= rcosθ and y= rsinθ then$\frac{\partial f}{\partial \theta}$ is

(i) r (ii)r^2 (iii) 1 (iv) 0

20.If f(x, y)=x^2y+siny+e^x then $f_x(1,\pi)$ is

(i)2π-e (ii)2π (iii)2π+e (iv) 0

21. $u = \cos^{-1}\left(\frac{x+y}{\sqrt{x}+\sqrt{y}}\right)$ is homogeneous function of degree

(i) $\frac{1}{2}$ (ii) 1 (iii) 2 (iv) 3

22. If $u = \tan^{-1}\left(\frac{x^3+y^3}{x-y}\right)$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = ?$

(i) sinu (ii) cosu (iii) sin2u (iv) tanu

23. If $u = \frac{y^2}{x}$, $v = \frac{x^2}{y}$ then $\frac{\partial(x,y)}{\partial(u,v)} = ?$

(i) -3 (ii) 3 (iii) -$\frac{1}{3}$ (iv)$\frac{1}{3}$

24. *if* $x = r\cos\theta$, y= r $\sin\theta$, z=z then$\frac{\partial(x,y,z)}{\partial(r,\theta,z)} = ?$

(i)2r (ii)r^2 (iii)$\frac{1}{r}$ (iv)r

25.If u=$x^2 - 2y$ and v=x+y then $\frac{\partial(u,v)}{\partial(x,y)} = ?$

(i)2x (ii) 2x+2 (iii) 2y-2 (iv) 2x - y

ANSWERS

1.(iii) 2x+3y

2. (iii) 1

3. (ii) 2u

4.(iii)e

5. (iii) 2

6.i) $-\frac{(\partial f/\partial x)}{(\partial f/\partial y)}$

7. (iii) 0

8. (iii) – 1

9. (ii) ½

10. (iii) saddle point

11. (i) (-3 , 0)

12. (iii) $4(u^2 + v^2)$

13. (ii) r

14. (iii) $\frac{1}{1+x^2}$

15. (i)zero

16. (ii)1

17. (ii)$\left(\frac{\pi}{3}, \frac{\pi}{3}\right)$

18. (iii) a saddle point

19. (iv) 0

20. (iii)2π+e

21. (i) $\frac{1}{2}$

22. (iii) sin2u

23. (iii) -$\frac{1}{3}$

24. (iv)r

25. (ii) 2x+2