

UNIT-4

MULTI VARIABLE CALCULUS

Multiple choice questions

1	The degree of the homogeneous function $z = \frac{\sqrt{x} + \sqrt{y}}{x+y}$ is _____
	a) $\frac{1}{2}$ b) 1 c) $-\frac{1}{2}$ d) -1
2.	If $u = xy$, then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} =$ _____
	a) u b) 2u c) 0 d) none
3.	If $u = \frac{xy}{x+y}$ then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} =$ _____
	a) 2u b) u c) 0 d) 1
4.	The function $f(x, y)$ has minimum value for _____
	a) $ln - m^2 = 0$ b) $ln - m^2 < 0$ c) $ln - m^2 > 0, l > 0$ d) $ln - m^2 > 0, l < 0$
5	If $f(x, y) = c$ where c is a constant the $dy/dx =$
	a) $-f_x$ b) f_x c) 0 d) None
6	$\frac{\partial(x, y)}{\partial(u, v)} \times \frac{\partial(u, v)}{\partial(x, y)} =$ _____
	a) 0 b) 1 c) n d) -1
7.	Let $x = r \cos \theta, y = r \sin \theta$. Then $\frac{\partial(x, y)}{\partial(r, \theta)} =$ _____
	a) r b) 1/r c) r^2 d) $\sin r$
8.	A stationary point of $xy + x - y$ is _____
	a) (-1, 1) b) (0, 1) c) (-1, -1) d) (1, -1)
9.	If $u = e^{x/y}$ then
	0 b) 1 c) 2 d) -1
10	The function $f(x, y)$ has maximum value for _____
	a) $ln - m^2 = 0$ b) $ln - m^2 < 0$ c) $ln - m^2 > 0, l >$ d) $ln - m^2 > 0, l < 0$
11	If $U = xsiny + ysinx$ then $U_{xy} - U_{yx} =$ _____
	(a) 1 b) 0 c) 2 d) none
12	If $u = \sin(x + y)$ then $\frac{\partial u}{\partial y} =$ _____
	(a) $\sin x$ (b) $\cos(x+y)$ (c) $\cos x$ (d) $\sin(x+y)$

13	f Z is a homogeneous function of degree n, then $x^2Z_{xx} + 2xyZ_{xy} + y^2Z_{yy} =$ ----- -----
	a) nZ b)0 c)n(n-1)Z d) none
14	If $U = \frac{x}{y}$ and $V = \frac{x+y}{x-y}$ then $\frac{\partial(U,V)}{\partial(x,y)}$ -----
	(a) 1 b)0 c)2 d) none
15	If $U = x^2 + 2xy + y^2 + x + y$ then $\frac{\partial^2 U}{\partial x^2}$ -----
	(a) 1 b)0 c)2 d) none
Fill in the blanks	
1.	The degree of the homogeneous function $f = ax^2 + 2hxy + by^2$ is_____
2	If $u = x^2y, v = xy^2$ then $\frac{\partial(u,v)}{\partial(x,y)} =$ _____
3	The minimum value of $x^2 + y^2 + z^2$ given that $x + y + z = 3a$ is _____
4	The stationary points of $x^3y^2(1 - x - y)$ are _____
5	If $x = r \cos\theta, y = r \sin\theta$, then $\frac{\partial x}{\partial r} =$ _____ and $\frac{\partial y}{\partial \theta} =$ _____
6	Two functions u and v are said to be functionally dependent if $\frac{\partial(u,v)}{\partial(x,y)} =$ _____
7	The stationary point of $x^2 + y^2 + 6x + 12$ is _____
8	The point at which a function has neither maxima nor minima is called _____
9	For the functions $u(x, y), v(x, y)$, the Jacobian $\frac{\partial(u,v)}{\partial(x,y)} =$ _____
10	If $z = x^2y$ then $\frac{\partial^2 z}{\partial x \partial y} =$ _____
11	If $\ln - m^2 = 0$, then the stationary points are called ____
12	If $U = x^2 + 2xy + y^2 + x + y$ then $\frac{\partial^2 u}{\partial x^2}$ -----
13	If $u = \frac{x}{y}, v = xy$ then $J \left(\frac{u,v}{x,y} \right) =$ _____
14	$f(x) = \log x - \log y$ is a homogeneous function of degree-----
15	If $U = x^y$ then $\frac{\partial U}{\partial x}$ -----