SRM Institute of Science and Technology
Ramapuram campus
Department of Mathematics
18MAB101T-Calculus and linear algebra

Year/Sem: I/I **Part-A** **Branch: Common to All**

Unit -II

Functions of several variables

1.	If u and v are functionally dependent then their Jacobian value is	1 Mark	
	a)zero b) one c) non-zero d)greater than zero	Ans (a)	(CLO-2 / Remember)
2.	If $rt - s^2 < 0$ then the point is	1 Mark	
	a)maximum point b) minimum point c) saddle point d) fixed point	Ans (c)	(CLO-2 / Remember)
3.	If $z = x^2 + y^2 + 3xy$ then $\frac{\partial z}{\partial x} =$	1 Mark	
	a)2y+3x b) 3y c) 2x+3y d) 2x	Ans (c)	(CLO-2 / Apply)
4.	If $u = \sin^{-1}(\frac{x^2 + y^2}{x - y})$ is a homogeneous function of degree	1 Mark	
	a) 2 b) 3 c)1 d) 4	Ans (c)	(CLO-2 / Apply)
5.	If f(x,y) is an implicit function then $\frac{dy}{dx} =$	1 Mark	

	a) $-\dfrac{\left(\frac{\partial f}{\partial x}\right)}{\left(\frac{\partial f}{\partial y}\right)}$ b) $\dfrac{\left(\frac{\partial f}{\partial x}\right)}{\left(\frac{\partial f}{\partial y}\right)}$ c) $\dfrac{\left(\frac{\partial f}{\partial y}\right)}{\left(\frac{\partial f}{\partial x}\right)}$ d) $-\dfrac{\left(\frac{\partial f}{\partial y}\right)}{\left(\frac{\partial f}{\partial x}\right)}$	Ans (a)	(CLO-2 / Remember)
6.	If $x = r\cos\theta$ *and* $y = r\sin\theta$ then $\dfrac{\partial(x,y)}{\partial(r,\theta)} =$	1 Mark	
	a) r b) r^2 c) 2r d) 1/r	Ans (a)	(CLO-2 / Apply)
7.	If u is a homogeneous function of degree n then $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} =$	1 Mark	
	a) n b) nu c) u d) n^2u	Ans (b)	(CLO-2 / Remember)
8.	If $x = u^2 - v^2$ *and* $y = 2uv$ then $\dfrac{\partial(x,y)}{\partial(u,v)} =$	1 Mark	
	a) $u^2 + v^2$ b) $2(u^2 + v^2)$ c) $4(u^2 + v^2)$ d) $4v^2$	Ans (c)	(CLO-2 / Apply)
9.	If $J_1 = J\left(\dfrac{x,y}{u,v}\right)$ and $J_2 = J\left(\dfrac{u,v}{x,y}\right)$ then $J_1J_2 =$	1 Mark	
	a) 0 b) -1 c) 2 d) 1	Ans (d)	(CLO-2 / Remember)
10.	The point (0.0) for $f(x,y) = x^3 + y^3 - 3axy$ is	1 Mark	
	a)maximum point b) minimum point	Ans (c)	(CLO-2 / Apply)

	c) saddle point d) fixed point		
11.	If $f(x,y)=x^2y+\sin y+e^x$ then $f_x(1,\pi)$ *is* is	1 Mark	
	a) $2\pi-e$ b) 2π c) $2\pi+e$ d) 0	Ans (c)	(CLO-2 / Apply)
12.	The stationary points of $x^2+y^2+6x+12$ are	1 Mark	
	a) (-3,0) b) (0,3) c) (0, -3) d) (3,0)	Ans (a)	(CLO-2 / Apply)
13.	The stationary points for $f(x,y)=\sin x+\sin y+\sin(x+y)$ are	1 Mark	
	a) $\left(\frac{\pi}{2},\frac{\pi}{3}\right)$ b) $\left(\frac{\pi}{3},\frac{\pi}{3}\right)$ c) $\left(\frac{\pi}{2},\frac{\pi}{2}\right)$ d) $\left(\frac{\pi}{3},\frac{\pi}{2}\right)$	Ans (b)	(CLO-2 / Apply)
14.	If $u=x^2-y^2$ *and* $v=2xy$ then $J\left(\frac{x,y}{u,v}\right) X\ J\left(\frac{u,v}{x,y}\right)=$	1 Mark	
	a) 0 b) -1 c) 2 d) 1	Ans (d)	(CLO-2 / Apply)
15.	If $f(x,y)=e^x\cos y$ then $f_{xy}(0,0)$ *is*	1 Mark	
	a) 0 b) -1 c) 2 d) 1	Ans (a)	(CLO-2 / Apply)
16.	If $u=ax^2+by^2+2hxy$ then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=$	1 Mark	

	a) u b) 2u c) 3u d) 4u	Ans (b)	(CLO-2 / Apply)
17.	If $x^y = y^x$, then $\frac{dy}{dx} =$	1 Mark	
	a) $(x\log y - y)y / x(y\log x - x)$ b) $(x\log x - x) / x(y\log y - y)$ c) $(x\log x - y)y / (y\log x - x)$ d) Does not exists	Ans (a)	(CLO-2 / Apply)
18.	If $f(x, y) = e^{xy}$ then $f_{yyy}(1,1)$ *is*	1 Mark	
	a) $-e$ b) $\frac{1}{e}$ c) e d) $-\frac{1}{e}$	Ans (c)	(CLO-2 / Apply)
19.	If $z = \log(x^2 + y^2 + xy)$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$	1 Mark	
	a) 1 b) 2 c) 0 d) 4	Ans (b)	(CLO-2 / Apply)
20.	If $f(x, y) = \tan^{-1}(y/x)$ then $f_x(1,1)$ *is*	1 Mark	
	a) 1/2 b) -1/2 c) 2 d) 1	Ans (b)	(CLO-2 / Apply)
21.	If V= x/y, then $x\frac{\partial v}{\partial x} + y\frac{\partial v}{\partial y} =$	1 Mark	
	(a) 2V (b) 3V (c) 4V (d) 0V	Ans (d)	(CLO-2 / Apply)

22.	Saddle points are ------------	1 Mark	
	(a) a minimum (b) a maximum (c) neither a minimum nor a maximum (d) None	Ans (c)	(CLO-2 / Remember)
23.	If u = x+y/1-xy, v= $\tan^{-1}x+\tan^{-1}y$ then the functional relationship between u and v is	1 Mark	
	a) u = tan v (b) v = tan u (c) x = tany (d) y = tan x	Ans (a)	(CLO-2 / Apply)
24.	Lagrange's method of undetermined multipliers is to find the maximum or minimum value of a function of	1 Mark	
	a) Two variables (b) Three or more variables (c) One variable (d) None	Ans (b)	(CLO-2 / Remember)
25.	The condition for a function f(x,y) to have a maximum value is that	1 Mark	
	(a) $rt-s^2$ (b) $rt-s^2>0$, $r>0$ or $s>0$ (c) $rt-s^2>0$, $r<0$ or $s<0$ (d) $rt-s^2 = 0, r>0$	Ans (C)	(CLO-2 / Remember)

26.	The condition for a function f(x,y) to have a minimum value is that	1 Mark	
	(a) $rt-s^2$ (b) $rt-s^2>0$, $r>0$ or $s>0$ (c) $rt-s^2>0$, $r<0$ or $s<0$ (d) $rt-s^2=0, r>0$	Ans (b)	(CLO-2 / Remember)
27.	The condition for a function f(x,y) to have neither a maximum nor a minimum value is that	1 Mark	
	(a) $rt-s^2<0$ (b) $rt-s^2>0$, $r>0$ or $s>0$ (c) $rt-s^2>0$, $r<0$ or $s<0$ (d) $rt-s^2=0, r>0$	Ans (a)	(CLO-2 / Remember)
28.	The point (a,b) is called a stationary point if	1 Mark	
	(a) $f_x(a,b)=0$, $f_y(a,b)=0$ (b) $f_{xx}(a,b)=0$ (c) $f_{yy}(a,b)=0$ (d) $f_{xx}(a,b)=0$, $f_{yy}(a,b)=0$	Ans (a)	(CLO-2 / Remember)
29.	The minimum value of the function $x^2+y^2+6x+12$ is	1 Mark	
	(a) $\frac{1}{2}$ (b)2 (c)1 (d)3	Ans (d)	(CLO-2 / Apply)
30.	The maximum value of the function $x^3+y^3-12x-3y+20$ is	1 Mark	
	(a) 75 (b)27 (c)35 (d)38	Ans (d)	(CLO-2 / Apply)
31.	The points at which there is no extreme value are called __________.	1 Mark	

	(a) maximum points (b) minimum points (c) saddle points (d) none	Ans (C)	(CLO-2 / Remember)
32.	If $u = xe^y \sin x$ $v = xe^y \cos x$ $w = x^2e^{2y}$ then the functional relationship is	1 Mark	
	(a) $u^2+w^2 = v$ (b) $v^2 + w^2 = u$ (c) $x^2+y^2 = u$ (d) $u^2+v^2 = w$	Ans (d)	(CLO-2 / Apply)
33.	In PDE, a real function depends	1 Mark	
	(a) One independent variable (b) More than one independent variable (c) No independent variable (d) None	Ans (b)	(CLO-2 / Remember)
34.	If z= x^2+y^2+2xy then $\partial z/\partial x$ is	1 Mark	
	(a)$2x^2+2y$ (b) 2x+2y (c) 2x-2y (d) 2y	Ans (b)	(CLO-2 / Apply)
35.	If x= rcosθ y = rsinθ then $\frac{\partial(r,\theta)}{\partial(x,y)}$	1 Mark	
	(a) 0 (b) 1 (c) r (d) 1/r	Ans (d)	(CLO-2 / Apply)
36.	If $u = \frac{x}{y} + \frac{y}{z} + \frac{z}{x}$, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} =$ ________.	1 Mark	

	(a) 1 (b) 3 u (c) – 1 (d) 0	Ans (d)	(CLO-2 / Apply)