QN	**SYBSc (Mathematics)** **Subject:MTH-301: Calculus of Several Variables** **Question Bank**	**ANS**
1	$lim_{(x,y)\to(0,0)} \frac{x-a}{y-b}$ along the path y=0 is (A) 0 (B) $\frac{a}{b}$ (C) $-\frac{a}{b}$ (D) None of these	**B**
2	$lim_{(x,y)\to(0,0)} \frac{x-1}{y-1}$ along the pathy= 2x is (A) 0 (B) $\frac{1}{2}$ (C) $-\frac{1}{2}$ (D) None of these	**A**
3	$lim_{x\to 0}\left[lim_{x\to 0} \frac{x^2-y^2}{x^2+y^2}\right]$= (A) 0 (B) 1 (C) -1 (D) None of these	**C**
4	$lim_{(x,y)\to(0,0)} \frac{x^2y^2}{x^2y+(x-y)^2}$ along the path is (A) 0 (B) 1 (C) -1 (D) None of these	**B**
5	limy→0 [lim x→0 $y\ sin\frac{1}{x}$]= (A) 0 (B) 1 (C)- 1 (D) None of these	**A**
6	If u is homogenous function of degree 7 then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}$= A) 7u B) 7 C) u D) none of these	**A**
7	If z is homogenous function of degree 2 then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}$= A) 2 B) 2z C) z D) none of these	**B**
8	If u is homogenous function of degree 0 then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}$= A) 0 B) 1 C) 2 D) none of these	**A**
9	If $u=x^2+xy+y^2$ is homogenous function of degree…… A) 3 B) 2 C) 1 D) none of these	**B**
10	If $u=x^3+xy^2$ is homogenous function of degree…… A) 3 B) 2 C) 1 D) none of these	**A**
11	If $u=x(1-x)$ and , $v=xy$, then ,$\frac{\partial(u,v)}{\partial(x,y)}$, (A) xy (B) x (C) y (D) None of these	**B**

12	If u = $x^2z + xy^2$, then then at(1,0,-1) is (A)- 2 (B)- 1 (C) 1 (D) None of these	**A**
13	If u = $x^3z + xy^2 - 2yz$, then $\frac{\partial u}{\partial z}$ at(1,2,3)is (A) -2 (B) -3 (C) -1 (D) None of these	**B**
14	If u = $x^3 + y^3$, then $\frac{\partial u}{\partial x}$ at(1,2)is (A) 3 (B) 2 (C) 4 (D) 5	**B**
15	If u =log(x+y+1), then$\frac{\partial u}{\partial x}$ at(1,2)is (A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{1}{3}$ (D) 3	**A**
16	If $u = \frac{x^4+y^4}{x+y}$ is homogenous function of degree…… A) 3 B) 2 C) 1 D) none of these	**A**
17	If u= $\sin^{-1}\frac{x^4+y^4}{x+y}$ is homogenous function of degree… A) 3 B) 2 C) 1 D) none of these	**A**
18	If u =$\tan^{-1}\frac{x^3+y^3}{x+y}$ is homogenous function of degree…… A) 3 B) 2 C) 1 D) none of these	**B**
19	A function $f(x,y)$, is said to be homogenous function of degree n then , $f(tx,ty)$ = A) $t^n f(x,y)$ B) $tf(x,y)$ C)$t^2 f(x,y)$ D) none of these	**A**
20	……is applicable only for homogenous function A) Euler's theorem B) Roll's theorem C) Lagrange's mean value theorem D) none of these	**A**
21	If $\frac{x^2}{y^2}$, then $\frac{\partial^2 z}{\partial x \partial y}$ ..... (A) $\frac{4x}{y^3}$ (B) $-\frac{4x}{y^3}$ (C) $\frac{4}{y^3}$ (D) None of these	**B**

22	If $f(x,y)$, is differentiable at (a,b) then (A) $f(x,y)$ is continuous at (a,b) (B) $f(x,y)$ is not continuous at (a,b) (C) $f(x,y$ is not defined at (a,b) (D) None of these	**A**
23	$lim_{(x,y)\to(0,0)}\frac{xy^2}{x^2+y^6}$,, along the path is $y^3 = x$ (A) 0 (B) 1 (C) $\frac{1}{2}$ (D) None of these	**C**
24	If z is a homogeneous function of degree 3, then, $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}$ = (A) z (B) 3z (C) 5 (D) None of these	**B**
25	If is a homogeneous function of degree n , then$x\frac{\partial u}{\partial x}$ + $y\frac{\partial u}{\partial y}=$ (A) nu (B) n (C) u (D) None of these	**A**
26	The area of the circle $x^2+y^2=r^2$ is……. A) πr B) πr^2 C) π D) none of these	**B**
27	The area of the circle $x^2+y^2=$16 is….. A) 16π B) 4π C) π D) none of these	**A**
28	The area of the ellipse $\frac{x^2}{16}+\frac{y^2}{25}$= 1 is ……. A) 20π B) 30π C) 40π D) none of these A	**A**
29	The area of the ellipse $\frac{x^2}{9}+\frac{y^2}{16}=$1 is ……. A) π B) 12π C)3π D) none of these B	**B**
30	If $u=x^2+y^2$ then $\frac{\partial u}{\partial x}$=…….. A) 2x B) 2y C) 0 D) none of these	**A**

31	If u is a homogeneous function of degree n , then $x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}$ = (A) nu (B) $n(n-1)u$ (C) n^2u (D) None of these	**B**
32	If is a homogeneous function of degree 1, then$x^2\frac{\partial^2 u}{\partial x^2}+2xy\frac{\partial^2 u}{\partial x\partial y}+y^2\frac{\partial^2 u}{\partial y^2}$ = (A) 0 (B) 1 (C) 2 (D)	**A**
33	Let u=$\frac{x^3+y^3}{x+y}$ be a homogeneous function, what is the degree of u ? (A) 2 (B) 0 (C) 1 (D) 1	**C**
34	Let u =$\frac{x^3+y^3}{x+y}$ be a homogeneous function, what is the degree of u ? (A) 2 (B) 3 (C) 1 (D) 4	**A**
35	If $z=xyf\left(\frac{x}{y}\right)$, then $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}=$ (A) (B) 2 (C) 0 (D) None of th	**B**
36	If $u=x^2+y^2$ then $\frac{\partial u}{\partial y}$ A) 2x B) 2y C) 0 D) none of these	**B**
37	If $u=x^2+y^2$ then $\frac{\partial u}{\partial y}$a(1,1) is….. A) 1 B) 2 C) 3 D) none of these	**B**
38	If $u=x^2+y^2$ then $\frac{\partial u}{\partial y}$at (1,1) is….. A) 1 B) 2 C) 3 D) none of these	**B**
39	If$f(x,y)=x^2+y^2$+3 then has extreme value at……. A) (0,0) B) (1,0) C)(0,1) D) none of these	**A**

40	If $f(x,y) = 3x^2 + 3y^2 - 2$, then has extreme value at……. A)(0,0) B) (1,0) C)(0,1) D) none of these ,	**A**
41	If $u = f(x,y), x = \emptyset(t), y = \psi(t)$, then is a composite function of (A) x (B) t (C) y (D) None of these B	**B**
42	If $z = f(x,y), x = \emptyset(u,v), y = \psi(u-v)$, then is a composite function of (A) $u\ and\ v$ (B) $x\ and\ y$ (C)) $u\ and\ x$ (D) None of these	**A**
43	If z= log $(x^2 + y^2)$, $x = u + v, y = u - v,$ then z is a composite function of (A)) $u\ and\ v$ (B) $x\ and\ y$ (C) $u\ and\ x$ (D) None of these	**A**
44	If , $f(x,y) = x^2 - 2y^2 + 1$ then f has extreme value at …….. (A) (1,1) (B)(0,0) (C)(1,0) (D) None of these	**B**
45	If , $f(x,y) = 2x^2 - y^2 + 3$ then has extreme value at …….. (A)(1,1) (B)(0,0) (C)(1,0) (D) None of these B	**B**
46	Stationary point of the function are obtained by….. A) 0 B) 0 & 0 C)0 D) none of these	**B**
47	lim$(x,y) \to (1,2)x + y =$ A) 3 B) 2 C) 1 D) none of these A	**A**
48	Lim $(x,y) \to (1,2)x^2 + y^2 =$,,... A) 0 B) 1 C) 5 D) none of these C	**C**
49	lim$(x,y) \to (1,2)x + y =$, ,... A) 0 B) 2 C) 1 D) none of these	**A**
50	$lim_{x\to 0}\left[lim_{y\to 0}\, x^2 + y^2\right]$lim….. A) 0 B) 2 C) 1 D) none of these	**A**
51	If $f(x,y) = x^2 - y^2 + 4$, then f has extreme value at …….. (A) 1,1 (B) 0,0 (C) 1,0 (D) None of these	**B**

52	Stationary points of the function $u(x,y)$are obtained by (A) u_x =0 (B) u_x =0 &u_y =0 (C) u_y =0 (D) None of these	**B**
53	If $f_{xx}a,b)$, $s=f_{xx}(a,b), t=f_{xx}(a,b)$, and $\Delta rt-s^2$ then $f(a,b)$, is the maximum at A) Δ>0 & r <0 (B) Δ>0 & r >0 (C) Δ<0 & r >0 (D) None of these	**A**
54	If $f_{xx}a,b)$, $s=f_{xx}(a,b), t=f_{xx}(a,b)$, and $\Delta rt-s^2$ then $f(a,b)$, is the minimum at (A) Δ>0 & r <0 (B)) Δ>0 & r >0 (C) Δ<0 & r >0 (D) None of these	**B**
55	If $f_{xx}a,b)$, $s=f_{xx}(a,b), t=f_{xx}(a,b)$, and $\Delta rt-s^2$, then $f(a,b)$, is the saddle point if A) Δ>0 & r <0 (B)Δ>0 & r >0 (C) Δ<0 & r >0 (D) None of these	**C**
56	$lim_{x\to 0}\left[lim_{y\to 0}\, xy\right]$ =….. A) 0 B) 2 C) 1 D) none of these A	**A**
57	$lim_{x\to 0}\left[lim_{y\to 0}\frac{2xy}{x^2+y^2}\right]$ along is….. A) 0 B) 2 C) 1 D) none of these	**B**
58	$lim_{x\to 0}\left[lim_{y\to 0}\frac{xy}{x^2+y^2}\right]$ along is….. A) $\frac{1}{2}$ B) 2 C) 1 D) none of these	**A**
59	$lim_{x\to 0}\left[lim_{y\to 0}\frac{2xy}{x^2+y^4}\right]$ along is….. A) $\frac{1}{2}$ B) 2 C) 1 D) none of these	**A**
60	$lim_{x\to 0}\left[lim_{y\to 0}\frac{2xy}{x^2+y^6}\right]$along is….. A) $\frac{1}{2}$ B) 2 C) 1 D) none of these	**A**

61	Maclaurin's theorem for a function of two variables obtained by Taylors theorem by putting (A) $a=0, b=0, h=x, k=y$ (B) $a=x, b=y, h=0, k=0$ (C) $a=0, b=x, h=y, k=0$ (D) None of these	**A**
62	$lim_{(x,y)\to(0,0)}\frac{xy}{x^2+y^2}$,, along X-axis is (A) 0 (B) 1 (C) 1 (D) None of these	**A**
63	Expression of $x+y=3$ in powers of$(x-1)$ and $(y-1$ is…… (A) 3+$(x-1)-(y-1)$ (B) $(x-1)-(y-1)$ (C) 31 (D) None of these A	**A**
64	Expression of $x+y=3$ in powers of 1$(x-1)$ and $(y-1)$ is…… (A) 31 1 (B) 1 1 (C) 3+$(x-1)$ (D) None of these A	**A**
65	$\int_0^1\int_0^1 \partial x\partial y=$ ……. (A) $\frac{1}{2}$ (B) 1 (C) 1 (D) None of these	**C**
66	$lim_{x\to0}\left[lim_{y\to0}\frac{xy}{x^2+y^8}\right]$ along $y^4=x$ is….. A) $\frac{1}{2}$ B) 2 C) 1 D) none of these	**A**
67	The area of the region & is obtained by evaluating …… A) line integral B) double integral C) Triple integral D) none of these	**B**
68	If $u=x^2+y^2+z^2$ then $\frac{\partial u}{\partial z}=$ A) 2z B) 3z C) z D) none of these	**A**
69	If $u=x+y+z$ then $\frac{\partial u}{\partial z}$ at (1,1,1)is A) 1 B) 2 C) 2 D) none of these	**A**

70	If $x^2 + y^3 + z^4$ then at(1,1,1)is A) 1 B) 2 C) 2 D) none of these	**C**
71	$\int_0^1 \int_0^1 xdxdy$ ……. (A) $\frac{1}{2}$ (B) -1 (C) 1 (D) None of these	**A**
72	$\int_0^1 \int_0^1 x^2 dxdy$ ……. (A) $\frac{1}{3}$ (B) 1 (C) 1 (D) None of these	**A**
73	The volume of a region is obtained by evaluating …… (A) Line integral (B) double integral (C) Triple integral (D) None of these	**C**
74	Area of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ is……. (A) 45 sq unit (B) 20 sq unit (C) 400 sq unit (D) None of these	**B**
75	Identify the correct formula for $lim_{h\to 0} \frac{f(a+h,b+k)-f(a,b)}{k}$ (A)$f_x(a,b)$ (B) $f_y(a,b)$ (C) $f_{xx}(a,b)$ (D) None of these	**A**
76	Identify the correct formula for $lim_{k\to 0} \frac{f(a,b+k)-f(a,b)}{k}$ (A)$f_x(a,b)$ (B) $f_y(a,b)$ (C) $f_{xx}(a,b)$ (D) None of these	**B**
77	If the repeated limit exist but not equal then the simultaneous limit (A) does not exist (B) exists (C) may or may not exists (D) None of these	**A**
78	The value of repeated limit $lim_{y\to 0}\left[lim_{x\to 0} \frac{x^3+y^3}{x-y}\right]$ (A) 0 (B) 1 (C) 2 (D) 4	**A**
79	If $f(x,y) = \frac{xy}{x^2+y^2}$ then $f_x(0,0)$……. (A) 1 (B) 0 (C) 2 (D) 4	**B**

80	If $f(x,y)=\sqrt{xy}$, then $f_x(0,0)$ 0,0……. (A) 0 (B) 1 (C) 2 (D) 4 A	**A**
81	If $u=x^2+y^2+z^2$ then u is…… A) Homogenous function B) non- homogenous function C) both homogenous & non- homogenous function D) none of these	**A**
82	If $u=x^3+y^3+z^3$ then u is…… A) Homogenous function B) non- homogenous function C) both homogenous & non- homogenous function D) none of these	**A**
83	If u is homogenous function of degree n then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}+z\frac{\partial u}{\partial z}=$…. A) nu B) n C) u D) none of these	**A**
84	If u is homogenous function of degree 2 then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}+z\frac{\partial u}{\partial z}=\cdots$. A) 2 B) 2u C) 3u D) none of these	**B**
85	If u is homogenous function of degree 2 then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}+z\frac{\partial u}{\partial z}=$ …. A) 2 B) 2u C) 3u D) none of these	**C**
86	A function$f(x,y)$, is said to be homogeneous function of degree n , if $f(x,y)$,..... (A) $x^n\emptyset\left(\frac{y}{x}\right)$ (B) $x\emptyset\left(\frac{y}{x}\right)$ (C) $y\emptyset\left(\frac{y}{x}\right)$ (D) None of these	**A**
87	If $\sin^{-1}\frac{x^2+y^2}{x+y}$, then the value of $\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=$ ..... (A) sin$u$ (B) tan u (C) cos u (D) None of these	**B**
88	If $\tan^{-1}\frac{x^3+y^3}{x+y}$then the value of $\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=$ ..... . (A) sin u (B) sin 2u (C) cos u (D) None of these	**B**

89	Euler's theorem is applicable for …… (A) homogeneous function (B) Non-homogeneous function (C) Both homogeneous & Non-homogeneous function (D) None of these	**A**
90	The area of the circle is $x^2 + y^2 = a^2$…….. (A) sq unit (B) sq unit (C) sq unit (D) None of these	**C**
91	The area of the circle is $x^2 + y^2 = 9$ is …….. (A) 9 sq unit (B) 4sq unit (C) 3 sq unit (D) None of these A	**A**
92	The area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2}$ 1 is …….. (A) sq unit (B) sq unit (C) sq unit (D) None of these	**C**
93	The volume of the sphere $x^2 + y^2 + z^2 = a^2$ is …….. (A) cu unit (B) cu unit (C) cu unit (D) None of these	**B**
94	If $f(x, y) = x^3 + y^3 - 3x - 12y + 20$,, then f has extreme value at …. (A) (1,1) (B)(0,0) (C) 1,2) (D) None of these	**C**
95	If $f(x, y) = x^2 + y^2 + \frac{2}{x} + \frac{2}{y}$,then f has extreme value at ……. (A) (1,1) (B) (0,0) (C) (1,2) (D) None of these	**A**
96	If $(x, y) = x^2 + y^2$ then has extreme value at ……. (A)(1,1) (B) (0,0) (C) (1,2) (D) None of these	**B**

97	A function $f(x, y)$ is said to be continuous if…… (A) limit of function = value of function (B) limit of function does not exist (C) limit of function value of function (D) None of these	**A**
98	If the repeated limit exists and equal, then the simultaneous limit……. (A) does not exist (B) exists (C) may or may not be exists (D) None of these	**C**
99	The value of $lim_{x\to 0}\left[lim_{y\to 0}\, xy^2\right]$ = (A) 0 (B) 1 (C) 1 (D) None of these	**A**
100	The value of $lim_{x\to 0}\left[lim_{y\to 0}\, x+y\right]$ (A) 0 (B) 1 (C) 1 (D) None of these	**A**