SINHGAD COLLEGE OF ENGINEERING, PUNE

UNIT 4 JACOBEAN

1	If u = f(x,y)and v= g(x,y) , the Jacobian of u, v w. r. t. x, y is given by a) $J=\frac{\partial(u,v)}{\partial(x,y)}$ b) $J=\frac{\partial(u,v)}{\partial(x,x)}$ c) $J=\frac{\partial(x,y)}{\partial(u,v)}$ d) $J=-\frac{\partial(u,v)}{\partial(x,y)}$	a
2	If u = f(x,y)and v= g(x,y) , the Jacobian of inverse function is given by $J=\frac{\partial(u,v)}{\partial(x,y)}$ b) $J=\frac{\partial(u,v)}{\partial(x,x)}$ c) $J=\frac{\partial(x,y)}{\partial(u,v)}$ d) $J=-\frac{\partial(u,v)}{\partial(x,y)}$	c
3	If $u = x^2+y^2$, v = 2xy , then $\frac{\partial(u,v)}{\partial(x,y)}=$ a) $4(x^2-y^2)$ b) $4(x^2+y^2)$ c) $2(x^2-y^2)$ d) $2(x^2+y^2)$	a
4	If u = x(1-y), v = xy then $\frac{\partial(x,y)}{\partial(u,v)}=$ a) $\frac{1}{x+y}$ b) $\frac{1}{x}$ c) $\frac{1}{y}$ d) $\frac{1}{x-y}$	b
5	If $(u,v) are functions of (x,y) and (x,y) are functions of (r,s)$ then $\frac{\partial(u,v)}{\partial(r,s)}=$ a) $\frac{\partial(u,v)}{\partial(x,y)}\ \frac{\partial(u,v)}{\partial(r,s)}$ $b)\frac{\partial(u,v)}{\partial(x,y)}\ \frac{\partial(r,y)}{\partial(x,s)}$ $c)\frac{\partial(u,v)}{\partial(x,y)}\ \frac{\partial(x,y)}{\partial(r,s)}$ $d)\frac{\partial(u,v)}{\partial(r,y)}\ \frac{\partial(x,y)}{\partial(r,y)}$	c
6	Let f$(u,v,x,y)=0,\ g(u,v,x,y)=0$ be the implicit functions of u,v w.r.t x,y then $\frac{\partial(u,v)}{\partial(x,y)}=$ a) $(-1)\frac{\frac{\partial(f,g)}{\partial(x,y)}}{\frac{\partial(f,g)}{\partial(u,v)}}$ b) $(-1)^2\frac{\frac{\partial(f,g)}{\partial(x,y)}}{\frac{\partial(f,g)}{\partial(u,v)}}$ c) $(-1)^2\frac{\frac{\partial(f,g)}{\partial(u,y)}}{\frac{\partial(f,g)}{\partial(u,v)}}$ d) $(-1)^2\frac{\frac{\partial(f,g)}{\partial(x,v)}}{\frac{\partial(f,g)}{\partial(u,v)}}$	b
7	If $u+v+w=x+y+z$, $uv+vw+wu=x^2+y^2+z^2$, $uvw=\frac{1}{3}(x^3+y^3+z^3)$ then $\frac{\partial(f,g,h)}{\partial(x,y,z)}=$ a) $2(x-y)\,(y-z)\,(x-z)$ b) $(x+y)\,(y+z)\,(x+z)$ c) $(u-v)\,(u-w)\,(v-w)$ d) $2(u+v)\,(u+w)\,(v+w)$	a
8	If $u+v+w=x+y+z$, $uv+vw+wu=x^2+y^2+z^2$, $uvw=\frac{1}{3}(x^3+y^3+z^3)$ then $\frac{\partial(f,g,h)}{\partial(u,v,w)}=$ a) $2(x-y)\,(y-z)\,(x-z)$ b) $(x+y)\,(y+z)\,(x+z)$ c) $(u-v)\,(u-w)\,(v-w)$ d) $2(u+v)\,(u+w)\,(v+w)$	c
9	If $u+v+w=x+y+z$, $uv+vw+wu=x^2+y^2+z^2$, $uvw=\frac{1}{3}(x^3+y^3+z^3)$ then $\frac{\partial(u,v,w)}{\partial(x,y,z)}=$ a) $-\frac{2(x-y)\,(y-z)\,(x-z)}{(u-v)\,(u-w)\,(v-w)}$ b) $-\frac{2(x+y)\,(y+z)\,(x+z)}{(u+v)\,(u+w)\,(v+w)}$ c) $(-1)^2\frac{2(x-y)\,(y-z)\,(x-z)}{(u-v)\,(u-w)\,(v-w)}$ d) $\frac{(x+y)\,(y+z)\,(x+z)}{(u+v)\,(u+w)\,(v+w)}$	a
10	Let f$(u,v,w,x,y,z)=0,\ g(u,v,w,x,y,z)=0, h(u,v,w,x,y,z)=0$ be the implicit functions of u,v,w into x,y,z then $\frac{\partial u}{\partial x}=$ a) $-\frac{\frac{\partial(f,g,h)}{\partial(x,v,w)}}{\frac{\partial(f,g,h)}{\partial(u,v,w)}}$ b) $\frac{\frac{\partial(f,g,h)}{\partial(x,v,w)}}{\frac{\partial(f,g,h)}{\partial(u,v,w)}}$ c) $\frac{\frac{\partial(f,g,h)}{\partial(u,v,w)}}{\frac{\partial(f,g,h)}{\partial(u,v,w)}}$ d) $-\frac{\frac{\partial(f,g,h)}{\partial(x,y,z)}}{\frac{\partial(f,g,h)}{\partial(x,y,z)}}$	a
11	functions u,v….of x,y ….are said to be functionally dependent, a) if the corresponding inverse Jacobian is zero b) if the corresponding Jacobian is zero c) if the corresponding Jacobian is nonzero d) none of these.	b
12	$u=x^2+y^2$+2xy+2x+2y ,$v=e^xe^y$ are functionally dependent then the relation between them is	b

	a) $(logv)^2 - logv$ = u b) $(logv)^2 + 2logv$ = u c)$-(logv)^2 + logv$ = u d) $(logu)^2 + 2logu$ = v	
13	If $u = \frac{x+y}{1-xy}$, $v = \tan^{-1} x + \tan^{-1} y$ *are* functionally dependent, then the relation between them is a)u = sin v b) v = sinu c) u = tan v d) v = tan u	b
14	If $u = f(x, y)$, be the function of x,y then we write, $a) p = \frac{\partial u}{\partial x}$ $b) p = \frac{\partial u}{\partial y}$, c)p= $\frac{\partial^2 u}{\partial x^2}$ $d) p = \frac{\partial^2 u}{\partial y^2}$	a
15	If $u = f(x, y)$, be the function of x,y then we write, a) s= $\frac{\partial^2 u}{\partial x^2}$ $b)$ s = $\frac{\partial^2 u}{\partial y^2}$ c) s = $\frac{\partial^2 u}{\partial x \partial y}$ d) none of these	b
16	If $u(x, y) = x^2 + y^2 + 6x + 12$ then the minimum value of the function at (-3,0) is a)10 b)12 c)-10 d) -12	b
17	The function $u = f(x, y)$ is having maximum values at (a,b) if at (a,b) a)$rt - s^2 > 0$ b)$rt - s^2 < 0$ c)$rt - s^2 > 0$, r < 0 d)$rt - s^2 > 0$,r > 0	c
18	The function $u = f(x, y)$ is having minimum values at (a,b) if at (a,b) a)$rt - s^2 > 0$ b)$rt - s^2 < 0$ c)$rt - s^2 > 0$, r < 0 d)$rt - s^2 > 0$,r > 0	d
19	If u$(x, y) = x^2 + y^2 + 6x + 12$ then p = a)2$(x + 3)$ b)2$(x - 3)$ c)$(x + 3)$ d)-2$(x - 3)$	b
20	Let $f = xy(a - x - y)$ the minimum value of f(a/3, a/3) is a)$\frac{a^2}{27}$ b)$\frac{a^3}{27}$ c)$\frac{a^2}{17}$ d)$\frac{a^3}{17}$	b
21	The stationary values of the function $\frac{a^3}{x^2} + \frac{b^3}{y^2} + \frac{c^3}{z^2}$, where x + y + z =1is given by a)x = $\frac{a}{a+b+c}$, z = $\frac{c}{a+b+c}$ b) x = $\frac{a}{a+b+c}$, y = $\frac{b}{a+b+c}$, z = $\frac{c}{a+b+c}$ c) y = $\frac{b}{a+b+c}$, z = $\frac{c}{a+b+c}$ d) x = $\frac{a}{a+b+c}$, y = $\frac{b}{a+b+c}$	b
22	Let u = f(x,y,z) be a function of x, y and z. dx, dy, dz, du are known as……… errors in x, y, z and u respectively a) Relative b) Absolute c) Percentage d) none of these	b
23	Let u = f(x,y,z) be a function of x, y and z. $\frac{dx}{x}, \frac{dy}{y}, \frac{dz}{z}$, $\frac{du}{u}$ are known as ……. errors w. r. t. x, y, z and u respectively. a)Relative b) Absolute c) Percentage d) none of these	a
24	In calculating the volume of a right circular cylinder, errors of 2% and 1% are found in measuring height and base radius respectively. Then the percentage error in calculated volume of the cylinder is a)3 b) 1 c) 2 d) 4	d
25	When the errors of 2% and 3% are made in measuring its major and minor axes of ellipse respectively then the percentage error in the area of an ellipse is a) 4 % b) 5 % c) 3 % d) 1 %	b