An ISO 9001:2015 Certified Institute
SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING MAHAGAON
Site Chinchewadi, Gadhinglaj-Halkarni road, Tal-Gadhinglaj
General Science & Humanities Department

MCQs- Continuous Internal Evaluation (CIE)

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Trade : Computer Science and Engineering

Que. No.	Questions		Unit No
1	Question	$f(x, y) = x^2 + xyz + z$ Find f_x at (1,1,1)	
	A	0	
	B	1	
	C	3	
	D	-1	
	Answer:	c	
	Explaination	$f_x = 2x + yz$ Put (x,y,z) = (1,1,1) $f_x = 2 + 1 = 3$.	
2	Question	Find the differentiation of $x^3 + y^3 – 3xy + y^2 = 0$?	
	A	(x2−y)/x−y2−2y	
	B	(3x2−3y)/3x−3y2−2y	
	C	(3x3−3y)/3x−3y2−2y	
	D	(3x2−y)/3x−3y2−y	
	Answer:	b	
	Explaination	Differentiation of x^3 is $3x^2$ differentiation of y^3 is $3y^2$ dy/dx differentiation of -3xy is [-3y -3x dy/dx] differentiation of y^2 is 2y dy/dx Hence, d(x3+y3−3xy+y2)/dx=0 3x2+3y2dy/dx−3y−3xdy/dx+2ydy/dx=0 dy/dx=(3x2−3y)/3x−3y2−2y	
3	Question	In euler theorem $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = nz$, here 'n' indicates?	
	A	order of z	
	B	degree of z	
	C	neither order nor degree	
	D	constant of z	
	Answer:	a	
	Explaination	Statement of euler theorem is "if z is an homogeneous function of x and y of order then $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = nz$".	

	Question	For a homogeneous function if critical points exist the value at critical points is?	
	A	1	
	B	Equal to its degree	
	C	0	
	D	-1	
4	**Answer:**	c	
	Explaination	Using Euler theorem we have $xf_x + yf_y = nf(x, y)$ At critical points $f_x = f_y = 0$ $f(a, b) = 0$ $(a, b) \rightarrow$ critical points.	
	Question	$f(x, y) = \sin(y/x)x^3 + x^2y$ find the value of $f_x + f_y$ at $(x,y)=(4,4)$.	
	A	0	
	B	78	
	C	$4^2 . 3(\sin(1) + 1)$	
	D	-12	
5	**Answer:**	c	
	Explaination	Using Euler theorem we have $xf_x + yf_y = nf(x, y)$ Substituting $(x,y)=(4,4)$ we have $4f_x + 4f_y = 3f(4, 4) = 3/4(4^3 . \sin(1) + 4^3)$ $= 4^2 . 3(\sin(1) + 1)$.	
	Question	If $z=e^{\frac{x^2+y^2}{x+y}}$ then, $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}$ is?	
	A	0	
	B	$z\ln(z)$	
	C	$z^2 \ln(z)$	
	D	z	
	Answer:	b	
6	**Explaination**	Given $z=e^{\frac{x^2+y^2}{x+y}}$,let $u=\ln(z)=\frac{x^2+y^2}{x+y}=\frac{x(1+(y/x)^2)}{(1+y/x)} = x f(y/x)$ Hence u is homogeneous of order 1, Hence, $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=u$ Putting, $u = \ln(z)$ we get, $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y} = z\ln(z)$	
	Question	If $z=\sin^{-1}\frac{x^3+y^3+z^3}{x+y+z}$ then, $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}$.	
	A	2 tan(z)	
	B	2 cot(z)	
	C	tan(z)	
7	D	cot(z)	
	Answer:	a	
	Explaination	Given $z=\sin^{-1}\frac{x^3+y^3+z^3}{x+y+z}$, put $u=\sin(z)=\frac{x^3+y^3+z^3}{x+y+z}=x^2 f(y/x,z/x)$ Hence, $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=2u$ Putting $u = \sin(z)$, we get $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=2\frac{\sin(z)}{\cos(z)}=2\tan(z)$	

	Question	Maximize the function x + y – z = 1 with respect to the constraint xy=36.
	A	0
	B	-8
	C	8
	D	No Maxima exists
8	**Answer:**	d
	Explaination	Geometrically, we can see that the level curves can go further the origin along the cu xy=36 infinitely and still not reach its maximum value. What the Lagrange multiplier predicts in this case is the minimum value.
	Question	Value of $x\partial u/\partial x+y\partial u/\partial y$ if $u=Sin^{-1}(yx)(x\sqrt{}+y\sqrt{})/x^3+y^3$ is?
	A	-2.5 u
	B	-1.5 u
	C	0
	D	-0.5 u
9	**Answer:**	a
	Explaination	Since the function can be written as, $u=x^{-5/2}Sin^{-1}(y/x)(1+\sqrt{y/x})/1+(y/x)^3=x^nf(y/x)$, by euler's theorem, $x\partial u/\partial x+y\partial u/\partial y=-5/2u$
	Question	If z = $Sin^{-1}(x/y) + Tan^{-1}(y/x)$ then $x\,\partial z/\partial x + y\,\partial z/\partial y$ is?
	A	0
	B	y
	C	$1 + x/y\ Sin^{-1}(x/y)$
	D	$1 + y/x\ Tan^{-1}(y/x)$
	Answer:	a
10	**Explaination**	Given $z = Sin^{-1}(x/y) + Tan^{-1}(y/x)$ Let, $u = Sin^{-1}(x/y)$ and $v = Tan^{-1}(y/x)$ hence z = u + v Now, let u' = Sin(u) = x/y = f(x/y) hence u' satisfies euler's theorem, Hence, $x\partial u/\partial x+y\partial u/\partial y=0$ Hence, by putting $u'=e^{\wedge u}$, we get $x\partial u/\partial x+y\partial u/\partial y=0/e^{\wedge}u=0$,......(1) Now, let v'= Tan(v)=y/x=f(y/x) hence v' satisfies euler's theorem, Hence, $x\partial v/\partial x+y\partial v/\partial y=0$ Hence, by putting v'=ln(v), we get $x\partial v/\partial x+y\partial v/\partial y=0$,......(2) By adding eq(1) and eq(2), we get $x\partial z/\partial x+y\partial z/\partial y=1+x^2+y^2/x+ye^{x2+y2/x+y}$