CO3: Evaluate double and triple integrals and study their applications
CO4: Learn the use of change of variables in solving multiple integrals
CO5: Find the gradient of a scalar field and divergence, curl of a vector field
CO6: Know various integral theorems related to line, surface and volume integrals

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Mid Term Examination, Odd Semester 2022-23
B. Tech. (H) CS and B Tech EC (VLSI), I Year, I Semester
Subject Code: BMAS 1104, Subject Name: Engineering Calculus

Time: 2 Hours **Maximum Marks: 15**

Instruction for students:

*Attempt **ALL** sections.*

Section – A

*Attempt **All** Questions* 1 X 3 = 3 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	What is the point of maximum value of function $f(x,y) = 1 - x^2 - y^2$?	1	2	E	C
2	Find the n^{th} derivative of the function $y = cos^2 x$.	1	1	A	F
3	Find the relation between the functions u, v and w if $u = (x-y)(y+z)$, $v = (x+y)(y-z)$ and $w = y(x-z)$.	1	2	U	C

Section – B

*Attempt **All** Questions* 2 X 3 = 6 Marks

No.	Detail of Question	Marks	CO	BL	KL
4	If $u = sin^{-1}\left(\frac{\sqrt{x}-\sqrt{y}}{\sqrt{x}+\sqrt{y}}\right)$, prove that: $\frac{\partial u}{\partial x} = -\frac{y}{x}\frac{\partial u}{\partial y}$.	2	2	R	M
5	If $u = f(x^2 + 2yz, y^2 + 2zx)$, prove that $(y^2 - zx)\frac{\partial u}{\partial x} + (x^2 - yz)\frac{\partial u}{\partial y} + (z^2 - xy)\frac{\partial u}{\partial z} = 0$	2	2	An	P
6	If $x = \sqrt{vw}$, $y = \sqrt{wu}$ and $z = \sqrt{uv}$, then calculate the Jacobian $\frac{\partial(x,y,z)}{\partial(u,v,w)}$.	2	2	E	C

Section – C

*Attempt **All** Questions* 3 X 2 = 6 Marks

No.	Detail of Question	Marks	CO	BL	KL
7	If $y = e^{a\,sin^{-1}x}$, then prove that $(1-x^2)y_{n+2} - (2n+1)xy_{n+1} - (n^2+a^2)y_n = 0$. Also find $y_n(0)$.	3	1	A	C
8	Find the volume of the largest rectangular parallelepiped that can be inscribed in the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$. **OR,** Expand $f(x,y) = e^x tan^{-1}y$ in powers of (x - 1) and (y - 1).	3	2	E	P

CO – Course Outcome, BL – Abbreviation for Bloom's Taxonomy Level (R-Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, C-Create), KL – Abbreviation for Knowledge Level (F-Factual, C-Conceptual, P-Procedural, M-Metacognitive).