

USN:

--	--	--	--	--	--	--	--	--	--

CS2820 - Calculus for CS
B.Tech. CSE 4rd Semester
Internal Assessment 2

Date: 16 April. 2024 (Tue) **FN**

(B)

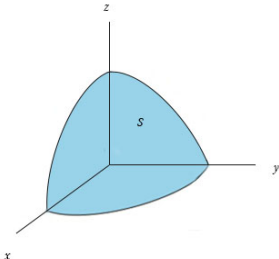
Marks: 15

Time: 1.0hr

Instructions

There are 7 questions. Q#1 is for 3 marks and is **compulsory**. Answer any 3 questions from Q#2 to Q#7. Only first 15 marks worth of attempt will be considered.

Q. No.	Question	Marks	CO	Blooms Level
1	For the function $f(x, y) = x \cos y + ye^x$, calculate all the second order partial derivatives with respect to all independent variables.	3	CO5	Ap
2	Find the tangent plane on the surface $F(x, y, z) = z - x^2 - 2y^2 + 1$ at the point $\left(1, \frac{1}{2}, \frac{1}{2}\right)$	4	CO5	Ap
3	The position of a particle at time t is specified by $(x, y) = (at, bt - ct^2)$, where a, b, c are positive constants. a). Find the time t at which the velocity of the particle is zero? b). If $a = 3$, $b = 4$ and $c = 0$, find the distance travelled by the particle during the time interval $[0, 2]$.	4	CO5	Ap

Q. No.	Question	Marks	CO	Blooms Level
4	<p>Using polar coordinates for double integral, find the volume of a segment of a sphere of radius 2 units centred at origin in the first octant.</p> 	4	CO8	Ap
5	<p>The temperature at a given point (x, y, z) in a room is given by, $T(x, y, z) = \frac{1}{2}e^{-(x^2+y^2+z^2)}$. What is the rate of change of temperature at the point $(1, 1, 1)$ along the direction $\mathbf{v} = \hat{i} + \hat{j} + \hat{k}$?</p>	4	CO6	Ap
6	<p>If $f(x, y, z) = e^x \sqrt{y}z$, estimate the value of $f(0.01, 24.8, 1.02)$. Hint: Calculate the linear approximation of the function at $(0, 25, 1)$.</p>	4	CO7	Ap
7	<p>Find the critical points of $f(x, y) = -x^3 + 4xy - 2y^2 + 1$ and determine for each critical point whether it is a saddle point, a maximum or a minimum.</p>	4	CO6	Ap

END