

Reg. No.:

Name :



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Mid-Term Examinations, November 2021

Programme : **B.Tech – CSE Health Informatics**
Course : **Introduction to Calculus**
Faculty : **Dr. Neha Choubey**
Time : **1½ hours**

Semester : **Fall 2021-2022**
Code : **MAT1031**
Slot/Class No. : **F11+F12+F13/0613**
Max. Marks : **50**

Answer all the Questions

Q. No.	Question Description	Marks
1	The Waverley can reach its top speed in 10 minutes. During that time its distance from the start can be calculated using the formula $D = \log t + 50t^{3/2}$ where t is the time in minutes and D is measured in metres. What is the Waverley's top speed? How fast is it accelerating?	10
2	Is the function $f(x, y) = \begin{cases} \frac{x}{\sqrt{x^2+y^2}}, & (x, y) \neq (0,0) \\ 0, & (x, y) = (0,0) \end{cases}$ continuous at the origin? Redefine the function if necessary to make it continuous.	10
3	The pressure P at any point (x, y, z) in space is $P = 800xyz^2$. Find the highest pressure at the surface of a unit sphere $x^2 + y^2 + z^2 = 5$.	10
4	Find the rate at which the area of a rectangle is increasing at a given instant when the sides of a rectangle are 4 ft and 3 ft and are increasing at the rate of 1.5 ft/sec and 0.5 ft/sec respectively.	10
5	The time T of a complete oscillation of a simple pendulum of length L is governed by the equation $T = 2\pi \sqrt{\frac{L}{g}}$ where g is constant. Find the approximate error in the calculated value of T corresponding to an error of 2% in the value of L .	5
6	If $\int_0^a (x^2 - 3x + 2) dx = \frac{3}{2}$ then find the integer value of a .	5

