QP CODE: D1BMT2402

Name: .....
Reg.No.: .....

FIRST SEMESTER FYUGP EXAMINATION NOVEMBER 2024

MINOR

MAT1MN101 CALCULUS

Time : 2 Hrs **Maximum Marks : 70**

BL - Bloom's Taxonomy Level (1 to 6) CO - Course Outcome

Section A

Ceiling Marks : 24

Answer all questions. Each carries 3 marks.

No.	Question	M	BL	CO
1.	Find the slope and equation of the tangent line to the graph of the equation $y = -x^2 + 4x$ at the point $P(2,4)$.	3	2	CO1
2.	Find the derivative of $f(x) = (2+3x^2)(x^3-5)$	3	4	CO1
3.	Find the differential of the function $f(x) = \sqrt{2x^2+1}$ at $x = 2$	3	1	CO1
4.	Find the critical numbers of the function $f(x) = x - 3x^{\frac{1}{3}}$	3	3	CO1 CO2
5.	Define Inflection points of a function.	3	2	CO1 CO2
6.	Define Differential of a Function	3	2	CO1
7.	Find $\int \frac{dx}{(2x-4)^3}$	3	4	CO3
8.	Evaluate $\sum_{k=1}^{10} k^2$	3	3	CO3
9.	Expand $\sum_{k=1}^{n-1} Sin(\frac{k\pi}{n})$	3	5	CO3
10.	Define arc length function	3	1	CO3

Section B

Ceiling Marks : 36

Answer all questions. Each question carries 6 marks.

No.	Question	M	BL	CO
11.	a)State Quotient Rule of Differentiation b)Find the derivative of $f(x) = \frac{2x^2+x}{x^3-1}$	6	3	CO1
12.	At a distance of $12000ft$ from the launch site ,a spectator is observing a rocket being launched vertically .What is the speed of the rocket at the instant when the distance of therocket from the spectator is $13,000ft$ and increasing at the rate of $480ft\backslash^{sec}$?	6	4	CO1
13.	Water is poured to a conical funnel at the rate of 1 in^3/sec and flows out at the rate of $\frac{1}{2}$ in^3/sec.The funnel is a right circular cone with height of 4 $in.$ and a radius of 2 $in.$ at the base .How fast is the water level changing when the water is 2 $in.$ high?	6	6	CO1
14.	The edge of a cube ws measured and found to be 3 in. with maximum possible error of 0.02 in. Find the approximate maximum percentage error that would be incurred in computing the volume of the cube using this measurment.	6	5	CO1
15.	a)Find the intervals where the function $f(x) = x^2 - 2x$ is increasing and decreasing b)Find the relative maximum and relative minimum of this function	6	3	CO1 CO2
16.	Evaluate $\sum_{k=1}^{10}(3k^2)(2k+1)$	6	3	CO3
17.	Find the area of the region bounded by the graphs of $x = y^2$ and $y = x - 2$ by integrating with respect to y axis	6	4	CO3
18.	Find the area bounded by the regions $x = y^2, x = 2y + 3$	6	6	CO3

Section C

Answer any 1 question. Each carries 10 marks. (1x10=10 marks)

No.	Question	M	BL	CO
19.	Sketch the graph of the function $f(x) = x^3 - 3x^2 + 1$	10	6	CO1 CO2

20.	a) Find the area of the surface obtained by revolving the graph of $x = y^3$ on the interval [0,1] about the y- axis b)Find the area of the surface obtained by revolving the graph of $f(x) = \sqrt{x}$ on the interval [0,2] about the x- axis	10	2	CO3

***