

Register No.

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# SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po) Coimbatore - 641 107

AN AUTONOMOUS INSTITUTION



Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai  
INTERNAL ASSESSMENT EXAMINATION - III

Fourth Semester

B.E - Mechanical Engineering,

Mechanical and Mechatronics Engineering ( Additive Manufacturing)

19MA407 - Statistics and Numerical Methods

Regulations 2019

Duration : 1 Hours 30 Minutes

Date : 29.05.2023

Session : FN

Maximum: 50 Marks

Answer ALL questions

## PART A - (5 X 2 = 10 marks)

## Question

M CO BL

1. State Lagrange's interpolation formula.

2 CO-4 L-1

Find  $\frac{dy}{dx}$  at  $x=1$  from the following table.

x:	1	2	3	4
y:	1	8	27	64

2 CO-4 L-2

3. Evaluate  $\int_{1/2}^1 \frac{1}{x} dx$  by trapezoidal rule dividing the range into 4 equal parts.

2 CO-4 L-2

4. State Taylor series algorithm for the first order differential equations.

2 CO-5 L-1

5. Write down the R-K formula of fourth order to solve  $\frac{dy}{dx} = f(x, y)$ , with  $y(x_0) = y_0$ 

2 CO-5 L-1

## PART B - (2 X 13 = 26 marks)

(a) Find  $y(22)$  and  $y(43)$  using Newtons formula, given that

X : 20 25 30 35 40 45

Y(x): 354 332 291 260 231 204

13 CO-4 L-3

OR

(b) Compute  $f(0)$ ,  $f''(0)$ ,  $f''(4)$  from the following table,

13 CO-4 L-3

x:	0	1	2	3	4
f(x):	1	2.718	7.381	20.086	54.598

Using Modified Euler method, find  $y(0.2)$ ,  $y(0.1)$  given

7. (a)  $\frac{dy}{dx} = x^2 + y^2$ ,  $y(0) = 1$  13

OR

(b) Given  $\frac{dy}{dx} = \frac{1}{2}(1+x^2)y^2$  and  $y(0)=1$ ,  $y(0.1)=1.06$ ,  $y(0.2)=1.12$ ,  $y(0.3)=1.21$   
evaluate  $y(0.4)$  by Milnes's predictor-corrector method. 13


PART C - (1 x 14 = 14 Marks)

8. (a) By dividing the range into ten equal parts, evaluate  $\int_0^{\pi} \sin x \, dx$  by Trapezoidal & Simpson's rule. Verify your answer with actual integration. 14

OR

(b) If  $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ ,  $y(0) = 1$ , find  $y(0.2)$ ,  $y(0.4)$  by Runge - Kutta method of fourth order 14

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Faculty Incharge

  
HOD