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SNS College of Technology, Coimbatore-35.

(An Autonomous Institution)

Internal Assessment -III

Academic Year 2023-2024 (Even)

Fourth Semester

(Common to Agri, Auto, Food Technology, Mech)

B

19MAT202 – STATISTICS AND NUMERICAL METHODS (REGULATION 2019)

Time: 1.30 Hours

Maximum Marks: 50

PART – A (5 x 2 = 10 MARKS)

ANSWER ALL QUESTIONS

- | | | CO | Blooms |
|----|--|-----|--------|
| 1. | Given $f(0) = 0$, $f(1) = 1$ and $f(2) = 2$. Find the value of y at $x=3$ using Lagrange's interpolation formula. | CO4 | (App) |
| 2. | Write Newton's forward interpolation formula and state when it is used? | CO4 | (Rem) |
| 3. | A curve passes through $(0, 1)$, $(0.25, 0.9412)$, $(0.5, 0.8)$ $(0.75, 0.64)$ and $(1.0, 0.5)$. Find the area between the curve, x - axis and $x = 0$, $x = 1$ by Trapezoidal rule. | CO4 | (Und) |
| 4. | Using Euler's method solve $y' = x + y$, $y(0)=1$. Compute y at $x = 0.1$ by taking $h = 0.1$. | CO5 | (App) |
| 5. | State Milne's predictor-corrector method. | CO5 | (Rem) |

PART –B (13+13+14 = 40 MARKS)

ANSWER ALL QUESTIONS

6. a) i) Find the missing term in the following table using Lagrange's interpolation :

x	0	1	2	3	4
y	1	3	9	-	81

- ii) The following data are taken from the stream table:

Temp: x	140	150	160	170	180
Pressure:y	3.685	4.854	6.302	8.076	10.225

Find the pressure at temperature $t=142$.

(OR)

b)i) Compute $f'(0)$ from the data:

CO4 (App)
(7)

x	0	1	2	3	4
y	1	2.718	7.381	20.086	54.598

ii) Evaluate the integral $\int_0^6 \frac{dx}{1+x^2}$ using Simpson's 1/3 rule with $h=0.5$. CO4 (Ana)
(6)

7. a) i) Using Taylor series method, find $y(0.1)$ correct to three decimal places given that $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$. CO5 (App)
(6)

ii) By applying modified Euler's method compute $y(0.25)$ with $h = 0.25$ from $y' = 2xy$, $y(0) = 1$. CO5 (App)
(7)

(OR)

b) Apply Milne's method find $y(2)$ if $y(x)$ is the solution of $\frac{dy}{dx} = \frac{x+y}{2}$ given $y(0) = 2$, $y(0.5) = 2.636$, $y(1) = ?$ and $y(1.5) = ?$ (find using Euler's method). CO5 (Ana)
(13)

8. a) i) The following data gives the velocity of a particle for 20 seconds at an interval of 5 seconds. find the initial acceleration using the entire data CO4 (App)
(7)

Time(sec)	0	5	10	15	20
Velocity(m/sec)	0	3	14	69	228

ii) Dividing the range into 10 equal parts, find the value of $\int_0^\pi \sin x dx$ by Trapezoidal rule. Also verify with normal integration. CO4 (Ana)
(7)

(OR)

b) Given compute $y(0.2)$ by Fourth order Runge-Kutta method CO5 (Ana)
(14)

$\frac{dy}{dx} = x^3 + y$, $y(0) = 2$.

Rem/Und: Remember/ Understand **App:** Apply **Ana:** Analyze **Eva:** Evaluate

Cre: Create