93707 **M-797**

Sl. No. **Total No. of Pages : 2**

V Semester III B.Sc. Examination, March/April - 2021
(Semester Scheme) (CBCS)
MATHEMATICS
SEC - 02 : Numerical Analysis

Time : 2 Hours **Max. Marks : 40**

Instructions : *1) Answer all the questions.*
2) First question carries 10 marks and remaining questions carry 15 marks.

1. Answer any five questions. Each question carries two marks.

a) Find an interval in which a real root of the equation

$x^3 - 2x^2 - 6x - 4 = 0$ lies.

b) State Runge - Kutta order method to solve $\frac{dy}{dx} = f(x,y),\ y(x_0) = y_0$.

c) Construct a forward difference table for

x	0	5	10	15	20	25
$f(x)$	7	11	14	18	24	32

d) Evaluate $\Delta^{10}(1-2x)(1-3x^2)(1-4x^3)(1-5x^4)$.

e) Write Lagrange's interpolation formula for unequal intervals.

f) By using Newton - Raphson Method find $\sqrt{23}$ correct upto 3 decimal places.

g) Show that $\Delta^3 y_0 = y_3 - 3y_2 + 3y_1 - y_0$.

h) State Simpson's $\frac{1}{3}^{rd}$ rule for n intervals.

P.T.O.

2. Answer any three questions. Each question carries five marks.

a) Find a real root of the equation $x^3-x-4 = 0$ correct to three decimal places by Bisection Method.

b) Find a real root of the equation $x^3-3x+1 = 0$ correct to three decimal places by Newton - Raphson Method.

c) Solve $\frac{dy}{dx}=2xy+1$ with $y(0) = 1$ Find y for $x = 0$ (0.2)1 using Euler - cauchy method.

d) Use Picard's method to find approximate value of y at $x = 0.2$ for $\frac{dy}{dx}=x-y, y(0)=1$ upto 3rd approximation.

e) Solve $\frac{dy}{dx}=x+y$ given that $y(0) = 0$ for $x = 0$ (0.1) 0.2 by modified Euler's method.

3. Answer any three questions. Each question carries five marks.

a) Find the 10th term of the Series 8, 12, 19, 29, 42 _____.

b) Estimate $f(4.2)$ from the following table

x	0	2	4	6
y	2	10	66	218

c) Derive the Trapezoidal rule using general quadrature formula for equidistant ordinates.

d) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ with n = 5 using Simpson's $\frac{3}{8}^{th}$ rule.

e) Evaluate $\int_0^2 (x^4+x)\,dx$. with n = 6 by using Weddle's rule.

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