54246

V SEMESTER B.Sc EXAMINATION – MARCH/APRIL 2022
SCHEME: SEMESTER – CBCS
MATHEMATICS
Numerical Analysis (SEC)

038

Time: 02 Hours **Max Marks: 40**

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

1. Answer any FIVE questions. Each question carries two marks. **5x2=10**

a) Find the interval in which the equation $x^3 - 9x - 12 = 0$ has a real root.

b) Using Newton-Raphson interation formula, find $\sqrt{22}$ approximately.

c) Find the approximate value of y at $x = 0.2$ by Euler-Cauchy method, given $\frac{dy}{dx} = y,\ y(0) = 1,\ h = 0.1$.

d) Given $u_0 = -3, u_1 = 6, u_2 = 8, u_3 = 12$ and third differences being constant find u_6.

e) Prove that $E = 1 + \Delta$

f) Show that $\Delta^4 0^5 = 240$.

g) Construct a forward difference table from the data given below:

x	1	2	3	4	5
Y	2	5	10	17	26

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

2. Answer any Three questions. Each question carries five marks. **3x5=15**

a) Find the real root of the equation $x^3 - 5x - 7 = 0$ correct to 3 decimal places by bisection method.

b) Find a real root of the equation $xe^x - 2 = 0$ correct to 3 decimal places by the method of false position.

c) Find a real root of the equation $x^3 - 2x - 5 = 0$ correct to 3 decimal places by Newton-Raphson method.

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d) Solve $\frac{dy}{dx} = y - \frac{2x}{y}$, $y(0) = 1, x = 0(0.2)0.6$ using Euler's method.

e) Solve $\frac{dy}{dx} = 2x - y$ using Runge-Kutta fourth order method for $x = 0\ (0.5)1$ with initial values $x = 0$ and $y = 1$.

3. Answer any THREE question. Each question carries five marks. 3x5=15

a) Estimate the population for the year 1986 from the following table:

Year :	1951	1961	1971	1981	1991
Population in Crores :	46	66	81	93	101

b) Estimate the missing term in the following table:

X	0	1	2	3	4
Y	1	3	9	-	81

c) Evaluate $\int_0^1 \frac{x}{1+x^2}\,dx$ using Simpson's $\frac{3}{8}^{th}$ rule by dividing interval into 3 equal parts.

d) Find the value of $\int_0^{1.2} \frac{dx}{1+x^2}$ using Weddle's rule with $n = 6$, and hence find the approximate value of π.

e) Evaluate $\int_1^2 \frac{dx}{x}$ by trapezoidal rule with $n = 6$.

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