B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
III Year V Semester
Core Elective - Paper I
NUMERICAL METHODS

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define rounding off error.
2. Give the geometrical interpretation of the Newton –Raphson method.
3. Solve $x + y = 2,\ 2x + 3y = 5$ using Gauss elimination method.
4. Define factorial function.
5. Compare Gauss- Elimination and Gauss- Seidal method.
6. State Newton's backward difference interpolation formula.
7. Prove that $\nabla = 1 - E^{-1.}$
8. What is the error in Simpson's $1/3$ rd rule for numerical integration?
9. State Adam- Bashforth Predictor- Corrector formula.
10. Find the first approximation of the root of the equation x^3-x-11=0 by using bisection method which lies between 2 and 3.
11. Write the Newton-Cote's quadrature formula for numerical integration.
12. Explain the terms (i) Round of error. (ii) Truncation error.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Find the root of the equation x^3-3x-5=0 by the method of false position.
14. Show that $\nabla\ ^r f(x) = \triangle^r\ f(x - r)$.
15. Construct Newton's Forward interpolation polynomial for the data below:

x	4	6	8	10
f(x)	1	3	8	16

16. Apply Lagrange formula to find $f(x)$ from the following data:

x	0	1	2	5
f(x)	2	3	12	147

17. Using Euler's method find $y(0.1)$ and $y(0.2)$ given $\frac{dy}{dx} = 1 + xy,\quad y(0) = 2.$

18. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal rule by taking $h = 0.2$.

19. Find the missing term in the table below:

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

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Find the real root of $xe^x - 2 = 0$ correct to three places of decimals using Newton-Raphson method.

21. Solve $28x + 4y - z = 32, \quad x + y + 10z = 24, \quad 2x + 17y + 4z = 35$ using Gauss –Jordan method.

22. Using Newton's divided difference formula, find the values of f(2), f(8), f(15) from the following data.

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

23. Evaluate $\int_0^{\frac{\pi}{2}} sinx\ dx$ using Simpson's $(\ 1/3\ )^{rd}$ rule by dividing the range into six equal parts.

24. Using Adam - Bashforth method find y(4.4) given $5xy' + y^2 = 2$, $y(4) = 1$, $y(4.1) = 1.0049$, $y(4.2) = 1.0097$, $y(4.3) = 1.0143$.

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