B.Sc. DEGREE EXAMINATION,APRIL 2019
II Year IV Semester
Numerical Methods

Time : 3 Hours   **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. Write down the relation between Δ and E.
2. What is interpolation?
3. Write Newton's forward difference interpolation formula.
4. When to use divided differences?
5. Give the relation between divided and forward differences.
6. To get more accurate results near the middle value of the table, we use‗‗‗‗‗.
7. Which formula is known as average of two Gauss's formulae?
8. Write the iterative formula of Newton Raphson method.
9. Give two direct methods to solve a system of linear equations?
10. State Lagrange's interpolation formula.
11. When does Simpson's rule give exact result?
12. State Trapezoidal rule.

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. Prove the properties of operators.
14. Find the missing term in the following.

1	2	3	4	5	6	7
2	4	8	-	32	64	128

15. Find the divided differences of $f(x) = x^3 + x + 2$ for the arguments 1, 3, 6, 11.

16. Find the equation $y = f(x)$ of least degree and passing through the points (-1,-21), (1, 15), (2, 12), (3, 3). Also find y at x = 0.

17. The population of a certain town is given below: Find the rate of growth of the population in 1981.

X(year):	1931	1941	1951	1961	1971
Y(population):	40.62	60.80	79.95	103.56	132.65

18. From the following data, find θ at $x = 84$.

X:	40	50	60	70	80	90
θ:	184	204	226	250	276	304

19. Evaluate $\int_{-3}^{3} x^4 dx$ by using Trapezoidal rule.

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

Answer any **THREE** questions

20. Derive Newton's Forward difference formula.

21. Using Lagrange's interpolation formula, find y(10) from the table given below:

X:	5	6	9	11
Y:	12	13	14	16

22. Apply Gauss's forward formula to find f(x) at x = 3.5 from the table below:

X:	2	3	4	5
Y:	2.626	3.454	4.784	6.986

23. Find the negative root of $x^2 + 4 \sin x = 0$ using Newton – Raphson method.

24. Evaluate $I = \int_{0}^{6} \frac{1}{1+x} dx$ using Trapezoidal rule and Simpson's rule (both).

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