B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
I Year II Semester
Allied Paper -II
ALLIED MATHEMATICS -II

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

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

Answer any **TEN** questions

1. Write the formula for Regula -falsi method.
2. What are the different methods of solving transcendental equations.
3. Prove that the finite difference of a product of two functions is given by $\triangle f(x).g(x) = f(x+h)\triangle g(x) + g(x)\triangle f(x)$.
4. Prove that $E[c\ f(x)] = c\ E\ f(x)$.
5. Prove that $(1+\triangle)(1-\nabla) \equiv 1$.
6. Given that $f(0) = 8,\ f(1) = 68$ and $f(5) = 123$, construct a divided difference table. Using the table determine the value of f(2).
7. Define Inverse interpolation.
8. State Lagrange's inverse interpolation formula.
9. State Newton's backward difference formula.
10. Use Trapezoidal rule to evaluate the approximate values of the definite integral $I = \int_0^1 \frac{dx}{1+x}$ correct to 3 decimals, taking h =0.25.
11. State Simpson One -Third formula.
12. Solve the equation $\frac{dy}{dx} = 1 - y$ with the initial conditions x=0, y=0, using Euler's method.

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

Answer any **FIVE** questions

13. Find a real root of the equation $x^3 + x^2 - 1 = 0$ by iteration method.
14. Solve $x^3 + 1.2x^2 - 4x - 4.8 = 0$ by bisection method.
15. The population of a town in the decennial census was as given below:

Year (x)	1891	1901	1911	1921	1931
Population (y) (in thousands)	46	66	81	93	101

Estimate the population for the year 1895.

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16. Obtain the function whose first difference is $x^3 + 3x^2 + 5x + 12$.

17. The values of x and y are given as follows:

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

Using Lagrange's interpolation formula find the values of y when x = 10.

18. A function y = f(x) is given in the table below:

x	2.94	2.96	2.98	3.00	3.02	3.04	3.06
f(x)	0.1826	0.1811	0.1797	0.1783	0.1769	0.1755	0.1742

Find the second derivative at x=3.

19. Use Taylor's method find y(0.1) from $y' + 2xy = 1$; y(0)=0 correct to 3 decimal places.

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

Answer any **THREE** questions

20. By using Newton- Raphson's method, find the root of $x^4 - x - 10 = 0$, which is near to x=2 correct to three places of decimals.

21. Given

x	1	2	3	4	5	6	7	8
f(x)	1	8	27	64	125	216	343	512

Find $f(7.5)$.

22. Find the value of x when y = 85,using Lagrange's formula for the following data:

x	2	5	8	14
y	94.8	87.9	81.3	68.7

23. Apply using (i)Simpson's one-third rule and (ii) Simpson's Three-Eighth rule to find the value of $\int_0^6 \frac{dx}{1+x}$.

24. Use Runge- Kutta method of fourth order to solve $y' = xy$ for x = 1.4. Initially x=1, y=2,h= 0.2

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