B.Sc DEGREE EXAMINATION,APRIL 2019
I Year II Semester
Allied Mathematics-II

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

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

Answer any **TEN** questions

1. Define Bisection method.

2. State Regula -Falsi formula.

3. Prove that $E = 1 + \Delta$.

4. State Newton's backward interpolation formula for equal intervals.

5. From the following table find $f(0)$ using Newton's divided difference interpolation formula:

x:	-1	1	2	3
$f(x)$:	-21	15	12	3

6. State Lagrange's inverse interpolation formula.

7. State Newton's backward difference formula to compute first and second derivatives.

8. What is Simpson's three-eighth formula ?

9. Find $y(0.01)$ if $\dfrac{dy}{dx} = -y$, $y(0) = 1$ by Euler's method.

10. Write down the Runge-Kutta formula of fourth order to solve $\dfrac{dy}{dx} = f(x,y)$ with $y(x_0) = y_0$.

11. Find the sixth term of the sequence 8, 12, 19, 29, 42, . . .

12. Obtain the divided difference table for

x:	0	2	3	4	7
$f(x)$:	4	23	58	112	466

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

Answer any **FIVE** questions

13. Find the real root of the equation $x^3 - 10x - 5 = 0$ by iteration method

14. Find $f(x)$ and $f(0.5)$ of the following table

x:	0	1	2	3	4	5	6
$f(x)$:	-1	3	19	53	111	199	323

15. From the following table find $f(5)$ using Newton's interpolation formula.

    $x:$ 0 1 3   6
    $f(x):$ 1 4 88 1309

16. Evaluate $\displaystyle\int_0^1 \frac{x^2}{1+x^3}\, dx$ using Simpson's one-third rule with h= 0.25.

17. Solve numerically $\dfrac{dy}{dx} = x + y$, $y(0) = 1$ for $x = 0.2, 0.4, 0.6, 0.8, 1.0$ by Euler's method.

18. Find the positive root of $x^3 - 5x + 3 = 0$ by Newton-Raphson method correct to three decimal places.

19. Using Taylor series method find $y(1.1)$ given $\dfrac{dy}{dx} = x + y$, $y(1) = 0$.

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

Answer any **THREE** questions

20. Find a real root of the equation $x^3 - 5x - 7 = 0$ using Regula-Falsi method.

21. Use Newton's formula for interpolation to find the net premium at age 25 from the table given below.

    Age: 20   24   28   32
    Annual Premium: 0.01427 0.01581 0.01772 0.01996

22. Using Lagrange's interpolation formula, find the value of y when x= 10 for following data.

    x: 5   6   9   11
    y: 12 13 14 16

23. Find the second derivatives of $f(x)$ at $x = 2.96$ at by Newton's forward formula from the following data.

    $x:$ 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

24. Using Runge-Kutta method of fourth order, find $y(0.8)$ correct to 4 decimal places if $\dfrac{dy}{dx} = y - x^2$, $y(0.6) = 1.7379$, taking h $= 0.1$

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