B.Sc.DEGREE EXAMINATION,APRIL 2020
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. State Regula Falsi method.
2. Define Newton-Raphson method.
3. Prove that$(1 + \Delta)(1 - \nabla) = 1$.
4. State Newton's forward formula for equal intervals.
5. Find the divided difference table for the following table.

x	:	1	3	6	11
$f(x)$	:	4	32	224	1344

6. State Lagrange's inverse interpolation formula.
7. Find the first derivative at $x = -3$ from the following table.

x :	-3	-2	-1	0	1	2	3
y :	-33	-12	-3	0	3	12	33

8. What is the trapezoidal formula?
9. State Taylor's method to find the numerical solution of a first order differential equation.
10. State Euler's method to find the numerical solution of a first order differential equation.
11. Show that $\left(\frac{dy}{dx}\right)_{x = x_0} = \frac{1}{h}\left[\Delta y_0 - \frac{1}{2}\Delta^2 y_0 + \frac{1}{3}\Delta^3 y_0 - \cdots\cdots\right]$.
12. Using Simpson's one-third rule to evaluate $\int_1^2 \frac{dx}{x}$.

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

Answer any **FIVE** questions

13. Find by Newton's method the positive root of the equation $2x^3 - 3x - 6 = 0$ which lies between 1 and 2.
14. Find the value of y at $x = 21$ from the following data.

x	:	20	23	26	29
y	:	0.3420	0.3907	0.4384	0.4848

15. Using Lagrange's interpolation formula, find y(9.5) from the following table.

x	:	7	8	9	10
y	:	3	1	1	9

16. Evaluate $\int_0^1 e^x dx$ using by Simpson's one-third rule.

17. Using Taylor series method, find $y(0 \cdot 1)$ given $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$.

18. From the following table find $f(x)$ that using Newton's divided difference formula.

x	:	0	1	4	5
$f(x)$	:	8	11	68	123

19. Using Euler's method, solve numerically the equation $\frac{dy}{dx} = -y$, $y(0) = 1$and find y(0.04).

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

Answer any **THREE** questions

20. Find the root of $x^3 - 9x + 1 = 0$ by bisection method which lies in the interval$(2, 4)$.

21. Find $f(x)$and f(7) from the following table.

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

22. Using Lagrange's interpolation formula find y(10) from the following table.

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

23. Find the first and second derivative of the following table at $x = 0.6$.

x	:	0.4	0.5	0.6	0.7	0.8
y	:	1.5836	1.7974	2.0442	2.3275	2.6511

24. Use Runge-Kutta method of fourth order, to solve $\frac{dy}{dx} = xy$ for $x = 1.4$, y(1) $= 2$ and take h $= 0.2$.

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