

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN  
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)

Chromepet, Chennai - 600 044.

B.Sc.Mathematics - END SEMESTER EXAMINATIONS - APRIL 2025

SEMESTER - VI

**24UMAET6A02 - Numerical Methods**

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

### Section B

Answer any **SIX** questions ( $6 \times 5 = 30$  Marks)

1. Find the real root of  $x^3 - 3x + 1 = 0$  lying between 1 and 2 upto three places of decimals by Newton Raphson method.
2. Solve the equations  $x + y = 2$  and  $2x + 3y = 5$  by Gauss elimination method.
3. Compute the sixth term of the sequence 2, 6, 12, 20, 30, ...
4. Find the value of  $y$  at  $x = 6$  from the following table using Lagrange's formula.

<b>x</b>	3	7	9	10
<b>y</b>	168	120	72	63

5. Find  $y$  at  $x = 84$  from the following table using Newton backward interpolation formula.

<b>x</b>	40	50	60	70	80	90
<b>y</b>	184	204	226	250	276	304

6. Compute  $\frac{dy}{dx}$  at  $x = 51$  from the following data.

<b>x</b>	50	60	70	80	90
<b>y</b>	19.96	36.65	58.81	77.21	94.61

7. Solve  $\frac{dy}{dx} = 1 + xy$  with  $y_0 = 2$ . Find  $y(0.1)$  using Taylor's method.
8. Solve  $\frac{dy}{dx} = 1 - y$ ,  $y(0) = 0$  using Euler's method. Find  $y$  at  $x = 0.1$ .

### Section C

Answer any **THREE** questions ( $3 \times 10 = 30$  Marks)

9. Find the smallest positive root of  $x^2 - \log_e x - 12 = 0$  by Regula-falsi method.
10. State and prove the Fundamental theorem for finite differences.

**Contd...**

11. Using Newton's divided difference formula evaluate  $f(8)$  given that

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

12. Evaluate  $\int_0^{10} \frac{dx}{1+x^2}$  by using

(i) Trapezoidal rule.

(ii) Simpson's one third rule.

13. Compute  $y(0.1)$  and  $y(0.2)$  by Runge - Kutta method of fourth order for

the differential equations  $\frac{dy}{dx} = xy + y^2, y(0) = 1.$

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