Roll.No. | 20UCHAT1001

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.Chemistry- END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - I
20UCHAT1001 - Allied Mathematics - I

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

Section B

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

1. Show that $\frac{1}{2}(e - \frac{1}{2}) = 1 + \frac{1}{3!} + \frac{1}{5!} + ...$
2. Express $\cos 6\theta$ as a polynomial in $\cos\theta$.
3. Apply Newton's backward difference formula to compute a polynomial of degree 3, using the table given below.

x	3	4	5	6
y	6	24	60	120

4. If $\tan^{-1}(2 - i) = x + iy$, show that 4y = - log2.
5. If $A = \begin{pmatrix} cos\theta & sin\theta \\ -sin\theta & cos\theta \end{pmatrix}$ then show that A is orthogonal.
6. If $\frac{sin\theta}{\theta} = \frac{2165}{2166'}$ Examine that θ is equal to 3° 1' nearly.
7. Given the following values for x and y

x	0	1	2	3	4	5
y	3	12	81	200	100	8

   Find $\triangle^5 y_0$
8. If $sin(A + iB) = x + iy$, then prove that $x = \sin A \cos h\ B$.

Section C

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

9. Find the Sum the series $1 + \frac{1}{3} + \frac{1}{3}.\frac{3}{6} + \frac{1}{3}.\frac{3}{6}.\frac{5}{9} + ...$
10. Compute the Eigenvalue and Eigenvectors of
$\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$

contd.....

11. Prove that $-2^{10}\cos^5\theta\sin^6\theta = \cos 11\theta - \cos 9\theta - 5\cos 7\theta + 5\cos 5\theta + 10\cos 3\theta - 10\cos\theta$.

12. Use Lagrange's formula to compute y when x=2, given

x	0	3	5	6	8
y	276	460	414	343	110

13. If $\tan(\theta + i\varphi) = \cos\alpha + isin\ \alpha$, then prove that
    i) $\tan h\ 2\varphi = \sin\alpha$.
    ii)$\cos h\ 2\varphi = \sec\varphi$.

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