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 APRIL-2023
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. Sum the series 1 - $\frac{1}{4} + \frac{1.3}{4.8}$ - $\frac{1.3.5}{4.8.12} + \ldots\ldots \infty$.
2. Find the Eigen value and Eigen vector of the matrix $\begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$.
3. Verify cayley Hamilton Theorem for the matrix $\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$.
4. Express cos6θ in terms of cosθ.
5. Separate into real and Imaginary parts of log(4+3i).
6. Find the value of Y corresponding to x=2 from the following table

X	1	3	5	7
Y	1	27	125	343

7. Evalute sec h^2x + tan$h^2x = 1$.
8. Prove $\frac{e^2-1}{e^2+1} = \frac{\frac{1}{1!} + \frac{1}{3!} + \frac{1}{5!} + \ldots\ldots}{\frac{1}{1!} + \frac{1}{2!} + \frac{1}{4!} + \ldots\ldots}$

Section C

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

9. Sum the series $\sum_{n=1}^{\infty} \frac{2n+3}{(2n-1)2n(2n+1)}$.
10. Find Inverse of the Matrix using Cayley -Hamilton theorem $\begin{bmatrix} 1 & 2 & -1 \\ 3 & -3 & 1 \\ 2 & 1 & -2 \end{bmatrix}$

Contd...

11. Prove that $\sin^5\theta = \frac{1}{16}[sin5\theta - 5sin3\theta + 10sin\theta]$

12. Prove that $\sinh^{-1} x = log_e [x + \sqrt{x^2 + 1}]$.

13. The population of a town in decimal census were as under. Estimate the population for the year 1955

Year	1921	1931	1941	1951	1964
Population (in thousand)	46	66	81	93	101

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