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 -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. Show that $\frac{2}{1!} + \frac{3}{2!} + \frac{4}{3!} + ... = 2e - 1$
2. Show that $\frac{1}{2.3} + \frac{1}{4.5} + \frac{1}{6.7} + ... = 1 - log2$.
3. Classify $\begin{pmatrix} 2 & 4 & 8 \\ 6 & 2 & 8 \\ 2 & 2 & 2 \end{pmatrix}$ as the sum of a symmetric matrix and a skew symmetric matrix.
4. Compute the sum and product of the eigen values of the following matrix $\begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & 2 \\ 1 & 2 & 3 \end{pmatrix}$
5. Show that $2^5 \cos^6\theta = \cos 6\theta + 6\cos 4\theta + 15\cos 2\theta + 10$.
6. Compute the approximate values of θ in radians if $\frac{\sin\theta}{\theta} = \frac{863}{864}$.
7. Classify $\tan(\theta + i\varnothing)$ into real and imaginary parts.
8. Given the following values for x and y find $\Delta^5 y_0$

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

Section C

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

9. Compute the series $1 + \frac{1}{3} + \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + ...$
10. Verify Cayley Hamilton theorem for $\begin{pmatrix} 1 & 0 & -2 \\ 2 & 2 & 4 \\ 0 & 0 & 2 \end{pmatrix}$

Contd...

11. Show that that $\cos 8\theta = 128\cos^8\theta$ - $256\cos^6\theta + 160\cos^4\theta$ - $32\cos^8\theta + 1$.

12. If $\sin(A + iB) = x + iy$, then show that

    (i) $\dfrac{x^2}{\sin^2 A} - \dfrac{y^2}{\cos^2 A} = 1$

    (ii) $\dfrac{x^2}{\cosh^2 B} + \dfrac{y^2}{\sinh^2 B} = 1$

13. Use Newton's Forward Interpolation formula to evaluate y when x = 45 from the following table

x	40	50	60	70	80
y	3.7	4.9	6.3	8	10.2

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