Roll.No. | 25UCSGT1E01

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.Computer Science - END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - I

**25UCSGT1E01 - Mathematics for Computer Science - I**

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

## Section B

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

1. Find the sum of the series $1 + \frac{1}{3} + \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + ....$
2. Prove that $\cos 5\theta = 16\cos^5\theta - 20\cos^3\theta + 5\cos\theta$.
3. Find the Laplace transform of $te^{-t}\sin t$.
4. Find $L^{-1}\left\{\frac{s}{(s+2)^3}\right\}$
5. Compute the Eigenvalues of $\begin{bmatrix} 0 & 1 & 1 \\ -4 & 4 & 2 \\ 4 & -3 & -1 \end{bmatrix}$
6. Express $\tan 5\theta$ in terms of $\tan\theta$.
7. Find (i)$L(\cos^3 2t)$ (ii) $L(\sin 2t \sin t)$
8. Find $L^{-1}\left\{\frac{s-3}{s^2+4s+13}\right\}$

## Section C

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

9. Show that $\sum_{n=1}^{\infty} \frac{5n+1}{(2n+1)!} = \frac{2}{e} + \frac{e}{2}$
10. Verify Cayley Hamilton theorem for the matrix
    A$= \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & 1 & 1 \end{bmatrix}$
11. Ascertain that $2^6\sin^7\theta = 35\sin\theta - 21\sin 3\theta + 7\sin 5\theta - \sin 7\theta$
12. Show that $L\left(\frac{e^{-at} - e^{-bt}}{t}\right) = \log\frac{s+b}{s+a}$
13. Find $L^{-1}\left\{\frac{5s+3}{(s-1)(s^2+2s+5)}\right\}$

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