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 -2023
SEMESTER - I
20UCSAT1001 - Allied Mathematics 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 to infinity of the series $\frac{1}{1.1.3} + \frac{1}{2.3.5} + \frac{1}{3.5.7} + ...\infty$
2. Verify Cayley Hamilton theorem for the matrix $\begin{pmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{pmatrix}$
3. Expand $^{sin6\theta}/_{sin\theta}$ in terms of cosθ.
4. Find the laplace transform of (i) cos4t sin3t (ii) t^3 + sinh2t + e^{-5t}.
5. Find $L^{-1}\left\{\frac{1}{s(s^2+a^2)}\right\}$
6. Show that every square matrix is uniquely expressible as the sum of a Hermitian matrix and skew Hermitian matrix.
7. If $\frac{sinx}{x} = \frac{863}{864}$ Find an approximate value of x.
8. State and prove Shifting property of a laplace transform.

Section C

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

9. Find the Sum to infinity series $\frac{4}{2.4} + \frac{4.5}{2.4.6} + \frac{4.5.6}{2.4.6.8} + ...\infty$
10. Find the Eigen values and eigen vectors of the matrix $\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$
11. Prove that cos8θ = 1 - 32sin$^2\theta$ + 160sin$^4\theta$ -256sin$^6\theta$ + 128sin$^8\theta$.
12. Find the Laplace transform of (i) e^{7t}sin2t (ii) t^2cos4t.
13. Find $L^{-1}\left\{\frac{2s^2+10_s}{s(s^2-2s+5)(s+1)}\right\}$

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