

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.(CS) - END SEMESTER EXAMINATIONS APRIL-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. Solve: $1 + \frac{1+2}{2!} + \frac{1+2+2^2}{3!} + \dots$
2. Show that $\log \frac{n+1}{n-1} = \frac{2n}{n^2-1} + \frac{1}{3} \left(\left(\frac{2n}{n^2-1} \right)^3 \right) + \frac{1}{5} \left(\left(\frac{2n}{n^2-1} \right)^5 \right) + \dots$
3. Express the given matrix $\begin{bmatrix} 6 & 8 & 5 \\ 4 & 2 & 3 \\ 9 & 7 & 1 \end{bmatrix}$
4. Express $\tan 7\theta$ in terms of $\tan \theta$
5. Show that $\frac{\sin 6\theta}{\sin \theta} = 32 \cos^5 \theta - 32 \cos^3 \theta + 6 \cos \theta$.
6. Apply the property of Laplace transform to find $L(t^2 \cosh at)$
7. Solve $L(e^{2t} t \cos 5t)$
8. Solve $L^{-1} \left[\frac{s+2}{(s-2)^7} \right]$

Section C

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

9. Solve the series up to infinity:
 $1 + \frac{2}{6} + \frac{2.5}{6.12} + \frac{2.5.8}{6.12.18} + \dots$
10. Verify Cayley-Hamilton Theorem for $A = \begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$
11. Prove that $\sin^8 \theta = \frac{1}{2^7} [\cos 8\theta - 8\cos 6\theta + 28\cos 4\theta - 56\cos 2\theta + 35]$
12. State and Prove Initial and Final Value Theorem for a Laplace transform.
13. Determine $L^{-1} \left[\frac{4s+5}{(s-1)^2(s+2)} \right]$
