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. END SEMESTER EXAMINATIONS APRIL-2022
SEMESTER - I
20UCSAT1001 - Allied Mathematics - I

Total Duration : 3 Hrs. **Total Marks : 60**

Section A

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

1. Sum the series $1+\frac{3}{4}+\frac{3.5}{4.8}+\frac{3.5.7}{4.8.12}+...$
2. Show that $log\sqrt{12} = 1+(\frac{1}{2}+\frac{1}{3})\frac{1}{4}+(\frac{1}{4}+\frac{1}{5})\frac{1}{4^2}+(\frac{1}{6}+\frac{1}{7})\frac{1}{4^3}+...$
3. Verify Cayley-Hamilton theorem for $A = \begin{bmatrix} 8 & -8 & 2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$.
4. Express $\sin 7\theta$ in terms of $\sin\theta$.
5. Prove that $\cos^6\theta = \frac{1}{32}(\cos 6\theta + 6\cos 4\theta + 15\cos 2\theta + 10)$.
6. Determine: $L(t\ \sin 3t \cos 2t)$.
7. Evaluate $L^{-1}\left[\frac{s-3}{s^2+4s+13}\right]$.
8. Show that $\int_0^\infty$ t e^{-3t} sint dt$=\frac{3}{50}$.

Section B

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

9. Sum the series $1+\frac{3}{2!}+\frac{5}{3!}+\frac{7}{4!}+...\infty$.
10. Find the eigen values of the matrix $\begin{vmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{vmatrix}$
11. Prove that $\sin^4\theta\cos^3\theta = \frac{1}{64}[\cos 7\theta - \cos 5\theta - 3\cos 3\theta + 3\cos\theta]$.
12. Evaluate $\int_0^\infty \frac{e^{-t}-e^{-2t}}{t}$ dt.
13. Determine: $L^{-1}\left[\frac{1}{s(s+1)(s+2)}\right]$.

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