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.(AI) END SEMESTER EXAMINATIONS NOVEMBER -2023
SEMESTER - I
22UAIAT1001 - 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 $\frac{1^2}{3!} + \frac{2^2}{5!} + \frac{3^2}{7!} + ...$
2. Diminish the roots of the equation x^4 - $4x^3$ - $7x^2$ + $22x$ + 24 = 0 by 1 and hence solve the equation.
3. Show that 128 $\sin^8\theta = \cos 8\theta - 8\cos 6\theta + 28\cos 4\theta - 56\cos 2\theta + 35$.
4. If $x = a\cos(logx) + b\sin(logx)$, Show that x^2y_{n+2} + (2n+1)xy_{n+1} + $(n^2+1)y_n$ = 0.
5. Find the eigen values and eigen vectors of $\begin{pmatrix} 7 & 0 & -2 \\ 0 & 5 & -2 \\ -2 & -2 & 6 \end{pmatrix}$
6. Solve $6x^5$ + $11x^4$ - $33x^3$ - $33x^2$ + $11x$ + 6 = 0.
7. Show that $\frac{\sin 7\theta}{\sin\theta}$ = 64 $\cos^6\theta$ - 80 $\cos^4\theta$ + 24 $\cos^2\theta$ - 1.
8. Expand $\cos 8\theta$ in terms of $\cos\theta$.

Section C

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

9. Find the missing term in the following table:

x	1	2	3	4	5	6	7
y	2	4	8	-	32	64	128

10. Verify Cayley - Hamilton theorem and Compute A^4, given that $A = \begin{pmatrix} 2 & -2 & 1 \\ 0 & 1 & 2 \\ 1 & 0 & 1 \end{pmatrix}$
11. Solve x^4 - $11x^2$ + $2x$ + 12 = 0, given that $\sqrt{5}$ -1 is a root.
12. Separate into real and imaginary parts $\tanh(x+iy)$.
13. Solve the equation of circle of curvature of $\sqrt{x} + \sqrt{y} = 1$ at $(\frac{1}{4}, \frac{1}{4})$.

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