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 NOVEMBER-2022
SEMESTER - I
22UDSAT1001 - Allied Mathematics - I

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

Section A

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

1. Find the 7^{th} term of the sequence 2, 9, 28, 65, 126, ... and also find the general term.
2. Sum to n terms of the series $1/(1.2.3) + 1/(2.3.4) + 1/(3.4.5) + ...$
3. Find the eigen values and eigen vectors of A $= \begin{pmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{pmatrix}$
4. Transform the equation x^4 - $8x^3$ - x^2 + 68x + 60 = 0 into one which does not contain the term x^3. Hence, solve the equation.
5. Diminish by one of the roots of x^4 - $4x^3$ - $7x^2$ + 22x + 24 = 0 and hence, solve it.
6. If $\cos(A + iB) = \cos\theta + i\sin\theta$, show that $\cos 2A + \cosh 2B = 2$
7. If $x = u(1 + v)$, $y = (1 + u)$ find $\dfrac{\partial(x, y)}{\partial(u, v)}$
8. Examine $f(x, y) = x^3 + y^3$ - 12x - 3y + 20 for its extreme values.

Section B

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

9. Using Lagrange's interpolation formula, find $y(10)$ from the following table.

x	5	6	9	11
y	12	13	14	16

10. Verify Caley Hamilton theorem for A $= \begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$

    Hence, find its inverse

Contd...

11. Solve $x^5 + 4x^4 + x^3 + x^2 + 4x + 1 = 0$

12. Express $\cos 6\theta$ as a polynomial in
    a. $\cos\theta$
    b. $\sin\theta$

13. Find the radius of curvature for the curve$\sqrt{x} + \sqrt{y} = 1^{at}(1/4$, $1/4)$

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