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. Physics - END SEMESTER EXAMINATIONS APRIL - 2024
SEMESTER - III
20UPHAT3003 - Allied Mathematics I

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

Section B

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

1. Sum the series $\frac{1}{10} + \frac{1}{10} \cdot \frac{4}{20} + \frac{1}{10} \cdot \frac{4}{20} \cdot \frac{7}{30} + \ldots$
2. Sum the series $1 + \frac{1+2}{2!} + \frac{1+2+2^2}{3!} + \ldots$
3. Define symmetric matrix and skew symmetric matrix and give examples.
4. Express $\cos 8\theta$ in terms of $\sin\theta$.
5. Expand $cos^6\theta$ in series of cosines of multiples of θ.
6. If y(75) = 246, y(80) = 202, y(85) = 118, y(90) = 40. Find y(79).
7. Apply Newton's backward formula to find a polynomial of degree 3, which includes the following x, y pairs

x	3	4	5	6
y	6	24	60	120

8. If cosh u = secθ, Show that $u = \log\tan(\frac{\pi}{4} + \frac{\theta}{2})$.

Section C

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

9. Sum the series $\frac{1}{1} \cdot \frac{1}{2} - \frac{1}{2} \cdot \frac{1}{3} + \frac{1}{3} \cdot \frac{1}{4} - \frac{1}{4} \cdot \frac{1}{5} + \ldots$
10. Find the characteristic equation of the matrix
$\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and hence obtain its inverse.
11. Expand $\sin^3\theta\cos^5\theta$ in a series of sines of multiples of θ.
12. The values of x and y are given by

x	5	6	9	11
f(x)	12	13	14	16

Using Lagrange's interpolation formula find f(x) when x = 10.

13. If cos (x+iy) = cos θ + i sin θ, Prove that cos 2x+cos h2y = 2.

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