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 2025
SEMESTER - IV
20UPHAT4004 - Allied Mathematics - II

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

Section B

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

1. Demonstrate the Fourier series for $f(x)$ in $(-\pi, \pi)$ $f(x) = \begin{cases} 0, & -\pi < x < 0 \\ \pi, & 0 < x < \pi \end{cases}$.
2. Develop the Fourier series for the function $f(x) = x^2$ in $-\pi \leq x \leq \pi$.
3. Eliminate f and g from $z = f(x + ay) + g(x + by)$.
4. Eradicate the arbitrary function f_1 and f_2 from $z = f_1(x + y) + f_2(x - y)$.
5. Identify whether $\sqrt{p} + \sqrt{q} = x$.
6. Solve $z^2(p^2 + q^2 + 1) = 1$.
7. Determine $L(\sin^2 2t)$.
8. Extrapolate $L(e^{6t} - 5t\cos 2t)$.

Section C

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

9. Construct the Fourier series for the function $x \sin x$ in $[-\pi, \pi]$.
10. Estimate $\dfrac{\partial^2 z}{\partial x \partial y} = x^2 + y^2$.
11. Hypothesize the equation $xp + zq = y$.
12. Formulate the Laplace transform of $f(t)$ if $f(t) = \begin{cases} e^{-t}, & 0 \leq t \leq 4 \\ 0, & 4 < t < \infty \end{cases}$.
13. Evaluate the Laplace transform of $\left[\dfrac{e^{at} - \cos 6t}{t}\right]$.

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