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.CSc.(DS) - END SEMESTER EXAMINATIONS - APRIL 2025
SEMESTER - II

**22UDSAT2002 - Allied Mathematics - II**

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

## Section B

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

1. Find reduction formula for $\int_0^{\frac{\pi}{2}} \sin^n x dx$.
2. Solve $(D^2 - 7D + 12)y = e^{-2x}$.
3. From the P.D.E by eliminating $'a'$ and $'b'$ from $Z = f(x^2 + y^2 + Z^2)$.
4. If $L\{f(t)\} = F(s)$, prove that $L\{f(t)\} = \frac{1}{a}F\left(\frac{s}{a}\right)$, $a > 0$.
5. Obtain the Fourier coefficient $a_o$ and $a_n$ for $f(x) = x^2$ in $(-\pi, \pi)$.
6. Solve $(D^2 + 2D + 1)y = \cos 3x$.
7. Solve: $p + q = \sin x + \sin y$.
8. Find the value of $L(t^2 \sin at)$.

## Section C

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

9. Obtain reduction formula for $\int_0^{\pi/2} \sin^m x \cos^n x dx$.
10. Obtain the Fourier coefficient $a_o$ and $a_n$ for $f(x) = \frac{\pi - x}{2}$ in $(0, 2\pi)$.
11. Solve $(D^2 + 4D + 4)y = e^{2x} \cos 3x$.
12. Solve:$(mz - ny)p + (nx - lz)q = ly - mx$.
13. Prove that i) $L\left[\frac{f(t)}{t}\right] = \int_s^{\infty} f(s)\, ds$. ii) Find $L\left(\frac{1 - e^t}{t}\right)$.

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