

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.(AI) - END SEMESTER EXAMINATIONS - APRIL 2025

SEMESTER - II

**22UAIAT2002 - Allied Mathematics - II**

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

### Section B

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

1. Evaluate  $\int x^2 e^{3x} dx$  using Bernoulli's formula.
2. Solve  $(D^2 - 2D + 2)y = e^x \sin x$ .
3. Solve  $xp + yq = z$ .
4. Find the Laplace transform of  $\sin^2 2t$ .
5. Find the Fourier series for the function  $f(x) = \frac{x}{2}$  in the interval  $-\pi < x < \pi$ .
6. Solve:  $(D^2 + 3D + 2)y = e^{-2x} + \sin x$ .
7. Determine the PDE by eliminating the arbitrary function from  
 $z = f(x^2 + y^2, z - xy)$
8. Find Laplace transform of  $\left(\frac{e^{at} - e^{bt}}{t}\right)$ .

### Section C

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

9. Obtain the reduction formula for  $\int \sin^n x dx$ .
10. Compute the Fourier series for the function  

$$F(x) = \begin{cases} -x & -\pi \leq x \leq 0 \\ x & 0 \leq x \leq \pi \end{cases}$$
11. Solve:  $(D^2 + 4D + 13)y = e^{-2x} \cos 2x$ .
12. Solve  $(y - z)p + 4(z - x)q = x - y$ .
13. Evaluate the Laplace transform of  $te^{-t} \sin t$ .

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