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.DS - END SEMESTER EXAMINATIONS - NOV'2024
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. Show that $\int_0^{\pi/4} log(1+tanx)dx = \frac{\pi}{8}log2.$
2. Find the fourier series for the function $x + x^2$ in (-π,π).
   Deduce that $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + ... = \frac{\pi^2}{12}$
3. Find the constant a_0 of the fourier series for the function
   $f(x) = x$ in $0 \leq x \leq 2\pi$.
4. Solve $(D^2 + 3D + 2)y = e^{-2x} + sinx.$
5. Form a partial differential equation by eliminating the constant a and b from the equation $z = (x+a)(y+b)$.
6. Solve z^4p^2 - $z^2p = 1$.
7. Find the Laplace transform of $sinh(2t+3)$.
8. Find the Laplace transform of $e^{-t}\int_0^t \frac{sint}{t}dt.$

Section C

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

9. Using the formula evaluate $\int_0^{\pi/2} sin^9xcos^6xdx.$
10. Obtain the Fourier Series for the function,

$$f|x| = \begin{cases} \pi - x,\ 0 < x < \pi \\ \\ \frac{1}{2}(\pi - x),\ \pi < x < 2\pi. \end{cases}$$

Deduce that $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + ... = \frac{\pi}{4}.$

Contd...

11. Solve $(D^3 + 4\ D^2 + 4D)y = x^2e^{-2x}$.

12. Solve $(x^2$ - $yz)p + (y^2$ - $zx)q = z^2 - xy$.

13. (i) Find $L\left(e^t + \frac{1}{e^t}\right)^2$ (ii) Prove that $L(e^{at}) = \frac{1}{S-a}$.

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