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. Mathematics - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - II

20UMACT2004 - Integral Calculus and Fourier Series

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

Section B

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

1. Integrate $x\ cos\ 2x$.
2. Integrate $x^3\ e^{2x}$.
3. Integrate $\int e^{ax} \cos mx\ \cos nx dx$.
4. Integrate $e^x\ cos^2\ x$.
5. Evaluate $\int_0^\infty x^4 e^{-x}\ dx$.
6. Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$.
7. Find the Fourier constant a_0 for $f(x) = \begin{cases} -x, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$.
8. Find Fourier Sine series for $f\,(x) = x$ in $(0, l)$.

Section C

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

9. Evaluate $\int_0^\pi \cos^4 x \sin^4 x dx$.
10. Evaluate $\int_0^2 \int_0^x y dx dy$.
11. Find $\Gamma\frac{11}{2}$.
12. Expand the function $f(x)$ in Fourier series $f(x) = \begin{cases} \pi + x, & -\pi < x < 0 \\ \pi - x, & 0 < x < \pi \end{cases}$.
13. Obtain the Sine series for the function $f(x) = x(\pi - x),\ 0 < x < \pi$

*****