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.AI - END SEMESTER EXAMINATIONS - NOV'2024
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 $\int x^3 \, sinx \, dx$.
2. Using the reduction formula to evaluate $\int_0^{\pi/2} cos^9 x dx$.
3. Solve (D^2 - 2D + 1)$y = 5e^{3x} + cosh2x$.
4. Eliminate f and g from $z = f(x + ay) + g(x + by)$.
5. Find the value of L($sin3tcost$).
6. Evaluate $L^{-1}\left(\frac{s+2}{(s^2+4s+5)^2}\right)$
7. Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$, $z = x^2 + y^2 - 3$ at the point (2,-1,2).
8. Evaluate by Green's theorem $\int_C (xy+x^2)dx+(x^2+y^2)dy$, where C is the square formed by the lines $x = -1$, $x = 1$, $y = -1$, $y = 1$ in the xOy plane.

Section C

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

9. Find the Fourier series for the function $f(x) = e^x$ in (-π, π).
10. Solve $(y - z)p + (z - x)q = x - y$.
11. Using Laplace transform, Solve $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = e^{-x}$, given that $y = 0$, $\frac{dy}{dx} = 1$ when $x = 0$.
12. Prove that $\bar{A} = (2x + yz)\bar{i} + (4y + xz)\bar{j}$ - $(6z - xy)\bar{k}$, is solenoidal as well as irrotational also find the scalar potential of $\bar{A}$.
13. Using Stoke's theorem for the vector $\bar{F} = (x^2 - y^2)\bar{i} + 2xy\bar{j}$ in the rectangular region in the xOy plane bounded by the lines $x = 0$, $x = a$, $y = 0$, $y = b$.

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