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. END SEMESTER EXAMINATIONS NOVEMBER-2022
SEMESTER - II
**20UCHAT2002 - Allied Mathematics - II**

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

## Section A

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

1. Obtain a Fourier series for the function
$f(x) = |\, x \,|$ in - $\pi < x < \pi$.
2. Form the Partial differential equation by eliminating the arbitrary functions $f$ and $g$ from $z = f(x+y) + g(x-y)$.
3. State and prove change of scale property of Laplace Transform.
4. Show that $L^{-1}\left[log\left(\frac{s}{(s^2+4)^2}\right)\right] = \frac{1}{t}\left[4cos2t - 1\right]$.
5. Find the directional derivative of the function $xyz$ - $xy^2\ z^3$ at (1,2,-1) in the direction of the vector $\vec{i}$ - $\vec{j}$ - $3\vec{k}$.
6. Find the Laplace Transform of $e^{-t}\int_0^t \frac{sint}{t}dt$.
7. Solve: $p^2 + q^2 =$ x + y.
8. If $\vec{F} = x^2\ y\vec{i} + y^2\ z\vec{j} + xz^2\ \vec{k}$, then find curl curl $\vec{F}$.

## Section B

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

9. Find the Fourier series for the function
$f(x) = \frac{\pi - x}{2}, 0 < x < 2\pi$.
10. Solve: $x(y^2+z)p$ - $y(x^2+z)q = (x^2-y^2)z$.
11. Find (i)L$\left[t^2 cosat\right]$ (ii)L$\left[\frac{e^a t - cosbt}{t}\right]$
12. Evaluate $L^{-1}\left[\frac{5s+3}{(s-1)(s^2+2s+5)}\right]$
13. Verify Green's theorem for $\int_C (3x^2 - 8y^2)dx + (4y - 6xy)dy$, where C is the boundary of the region enclosed by the parabolas $x = y^2$ and $y = x^2$.

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