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 - IV
20UPHAT4004 - Allied Mathematics - II

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

Section B

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

1. Obtain the fourier series for the function $f(x) = \pi - x, 0 < x < 2\pi$.
2. Find the value of $L(sin3t\ cost)$.
3. Find the inverse Laplace Transform of $\frac{1}{s^2(s^2+81)}$.
4. Find $\phi(x, y, z)$, given that (1,1,1) = 3 and
   $\nabla\phi = (y + y^2 + z^2)\bar{i} + (x + z + 2xy)\bar{j} + (y + 2zx)\bar{k}$.
5. Solve $p^2 + q^2 = npq$.
6. Find the Laplace transform of $e^{2t} + 3cos^2t$. .
7. Show that $L^{-1}\left(log\frac{s^2+a^2}{s^2+b^2}\right) = 2\ \frac{cosbt - cosat}{t}$.
8. If $\overline{F} = xyz\bar{i} + xyz^2\bar{j} + x^2yz\bar{k}$, then find $div\ curl\ \overline{F}$.

Section C

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

9. Find the fourier series for $f(x)$ if $f(x) = \begin{cases} x-1, & -\pi < x < 0 \\ x+1, & 0 < x < \pi \end{cases}$.
10. Solve $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$.
11. Find the Laplace transform of $e^{-t}\int_0^t t\ cost\ dt$.
12. Find the inverse Laplace Transform of $\frac{s}{s^4+s^2+1}$.
13. Verify Green's theorem for $\int_C (x-2y)dx + xdy$ where C is the circle $x^2 + y^2$=1.

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