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.Chemistry - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - II
20UCHAT2002 - Allied Mathematics - II

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

Section B

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

1. Find the Fourier series of the function $f(x) = \begin{cases} -k; & -\pi < x < 0 \\ k; & 0 < x < \pi \end{cases}$.
2. Form the partial differential equation of the family of spheres of radius r with centre at (a, b, c).
3. Solve $z = px + qy + p^2\ q^2$.
4. Find the Laplace transform of the function $\frac{sin^2 t}{t}$.
5. Compute the Laplace inverse of $\frac{10}{(s+2)^6}$.
6. Determine the Laplace inverse of $\frac{s-3}{s^2+4s+13}$.
7. Show that $\vec{F} = (y^2 - z^2 + 3yz - 2x)\hat{i} + (3xz + 2xy)\hat{j} + (3xy - 2xz + 2z)\hat{k}$ is irrotational and solenoidal.
8. Test whether the surfaces $5x^2 - 2y - 9x = 0$ and $4x^2y + z^3 - 4 = 0$ are orthogonal at $(1, -1, -2)$.

Section C

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

9. Obtain a Fourier expansion for the function $f(x) = \frac{\pi - x}{2}; 0 < x < 2\pi$.
10. Solve $(3z - 4y)p + (4x - 2z)q = 2y - 3x$.
11. Calculate the Laplace transform of the function $\frac{cos3t - cos2t}{t}$.
12. Find the inverse Laplace Transform of $\frac{s^2}{(s^2 + a^2)^2}$.
13. Evaluate $\int_C \vec{F}\ .\overline{dr}$ where $\vec{F} = (x^2 - y^2)\hat{i} + 2xy\hat{j}$ and C is the square bounded by the coordinate axes and the lines $x = a$, $y = a$.

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