

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 - APRIL 2025

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)

- Find a_0 and a_n in the Fourier series for $f(x)$ in $[-\pi, \pi]$ if $f(x) = \begin{cases} -\pi, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$.
- Form the partial differential equation by eliminating the arbitrary constants from $Z = (x^2 + a)(y^2 + b)$.
- Find the singular solution of the equation $z = px + qy + p^2 + pq + q^2$.
- Find the value of $L(\sin 3t \cot)$.
- Find the Laplace Transform of $e^{-t} \int_0^t \frac{\sin t}{t} dt$.
- Obtain the Fourier Series for the functions
(i) $f(x) = \pi - x$ $0 < x < 2\pi$. (ii) $f(x) = 1/2(\pi - x)$ $0 < x < 2\pi$.
- Solve $xp + p^2 = q$.
- Eliminate the arbitrary function f from $f(x^2 + y^2 + z^2, z^2 - 2xy) = 0$.

Section C

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

- Find the Fourier series for the function $f(x) = \begin{cases} 1 + \frac{2x}{\pi}, & -\pi < x < 0 \\ 1 - \frac{2x}{\pi}, & 0 < x < \pi \end{cases}$.

Deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}$.

- From the partial differential equation by eliminating the arbitrary function φ from $xyz = \varphi(x^2 + y^2 - z^2)$.

Contd...

11. Solve the equation $z^2(p^2 + q^2) = x^2 + y^2$.

12. Find: (a) $L[e^t + \sin t]$. (b) $L[\cos t \cos 2t]$.

13. If $L\{f(t)\} = F(s)$, then Prove that

i) $L(e^{-at}f(t)) = F(s + a)$. ii) $L\left(\frac{f(t)}{t}\right) = \int_s^\infty f(s)ds$.
