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 - APRIL 2025
SEMESTER - III
20UMACT3005 - Differential Equations and Laplace Transforms

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

Section B

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

1. Solve: xp^2 - $2yp + x = 0$.
2. Solve: $(D^2 + 2D + 5)y = xe^x$.
3. Solve: $3x^2 \dfrac{d^2x}{dx^2} + x\dfrac{dy}{dx} + y = x$.
4. Solve: $p^2 + q^2 = npq$.
5. Evaluate $L(\sin^3 2t)$.
6. Find the value of $L\left(\dfrac{1-e^t}{t}\right)$.
7. Find $L^{-1}\left[\dfrac{s+2}{(s^2+4s+5)^5}\right]$.
8. Find $L^{-1}\left[\dfrac{s-3}{s^2+4s+13}\right]$.

Section C

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

9. Determine the equation (i) $y = xp + x(1+p^2)^{1/2}$ (ii) $y = 2px + y^2\ p^2$.
10. Solve: $\dfrac{d^2x}{dx^2} + y = sec\ x$.
11. (i) Solve: $(y^2 + z^2)p$ - $xyq = -xz$.
    (ii) Find the general solution of $(y+z)p + (z+x)q = x + y$.
12. (i) Find $L(te^{-t}\sin t)$
    (ii) Evaluate $\displaystyle\int_0^\infty \frac{e^{-t} - e^{-2t}}{t} dt$.
13. Solve the equation $\dfrac{d^2x}{dx^2} + 2\dfrac{dy}{dx} - 3y = \sin t$ Given that $y = y' = 0$ when $t = 0$.

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