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 - III
20UMACT3005 - Differential Equations and Laplace Transforms

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

Section A

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

1. Solve y = (x-a)p - p^2.
2. Solve $(D^2 - 4D + 3)y = e^x \cos 2x$.
3. Eliminating the arbitrary function from $f(x^2 + y^2, z - xy) = 0$.
4. Solve $p(1+q^2) = q(z-1)$.
5. State and prove initial and final value theorem.
6. Evaluate $\int_0^\infty \frac{e^{-t} - e^{-2t}}{t}$ dt.
7. Find $L^{-1}\left[\frac{s^2}{(s-1)^2}\right]$.
8. Find $L^{-1}\left[\frac{1+2s}{(s+2)^2(s-1)^2}\right]$.

Section B

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

9. i) Solve $x^2 p^2 + 3xyp + 2y^2 = 0$
   ii) Solve $xp^2 - 2yp + x = 0$.
10. Solve the differential equation by using method of variation of parameter.
    $2y'' + 18y = 6 \tan(3t)$.
11. i) Solve $p^2 + q^2 = x - y$
    ii) Solve $(3z - 4y)p + (4x - 2z)q = 2y - 3x$
12. i) Find L $(te^{-t}sint)$.
    ii) Find L $\left(sin^3 2t\right)$.
13. Using Laplace transform, solve the equation
    $\frac{d^2y}{dt^2} - 10\frac{dy}{dx} + 9y = 5t$, y(0)=-1, y'(0)=2.

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