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.(Maths) END SEMESTER EXAMINATIONS NOVEMBER -2023
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 $x^2p^2 + 3xyp + 2y^2 = 0$.
2. Solve $(D^2 + 16)\ y = 2\ e^{-3x} + \cos 4x$.
3. Solve $yz\ (ax + y + z)\ dx + zx(\ x + ay + z)\ dy + xy(x + y + az)\ dz = 0$.
4. Find the differential equation of all spheres whose centres lie on the z - axis.
5. Solve $q = xp + p^2$.
6. Define Laplace transform with an example and write the sufficient conditions for the existence of the Laplace transform.
7. Find $L(t^2\ e^{-3t})$.
8. Find inverse Laplace transform of $\dfrac{1+2s}{(s+2)^2(s-1)^2}$

Section C

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

9. Solve $y = xp + x\ (1+ p^2)^{1/2}$.
10. Solve the following equation by the method of variation of parameters $\dfrac{d^2y}{dx^2} + y = secx.$
11. Determine $(x^2$ - yz) p + $(p^2$ - zx)q = z^2 - xy.
12. Evaluate $\int_0^\infty te^{-3t}costdt.$
13. Solve the equation $\dfrac{d^2y}{dt^2} + 2\dfrac{dy}{dt} - 3y = sin3t$ given that $y = \dfrac{dy}{dt} = 0$ when t = 0 using Laplace Transforms

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