

**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 EXAMINATION APRIL / NOV – 2021
SEMESTER - III
20UMACT3005 - Differential Equations and Laplace Transforms

Total Duration : 3 Hrs	Total Marks : 75
MCQ : 30 Mins	MCQ : 15
Descriptive : 2 Hrs.30 Mins	Descriptive : 60

Section B

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

1. Solve $x^2 = (1 + p^2)$
2. Solve $(D^2 - 4D + 4)y = e^{2x} + \cos 2x$
3. Solve $z = px + qy + \sqrt{1 + p^2 + q^2}$
4. Evaluate $\int_0^\infty \frac{e^{-t} - e^{-2t}}{t} dt$
5. Find $L^{-1}\left(\frac{S}{(S^2 + a^2)^2}\right)$
6. Solve $x^2 \frac{d^2 y}{dx^2} + 4x \frac{dy}{dx} + 2y = e^x$
7. Solve $p^2 + q^2 = npq$
8. Form a partial differential equation by eliminating a, b from
 $(x - a)^2 + (y - b)^2 + z^2 = 1$

Section C

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

9. a) Solve $y = 2px + y^2 p^2$
- b) Solve $x^2 p^2 + 3xyp + 2y^2 = 0$

Contd...

10. Solve $(D^2 + 1)y = \tan x$, using the method of variation of parameters

11. Solve $(3z - 4y)p + (4x - 2z)q = 2y - 3x$

12. Find a) $L\left(\frac{1-e^t}{t}\right)$

b) $L(te^{-t} \sin t)$

13. Use Laplace transform and solve

$$\frac{d^2 y}{dt^2} + 2 \frac{dy}{dt} - 3y = \sin t$$

Given that $y = 0, \frac{dy}{dt} = 0$ when $t = 0$