

UG-431

BMS-13

**B.Sc. DEGREE EXAMINATION –
JUNE, 2019.**

First Year

Mathematics

DIFFERENTIAL EQUATIONS

Time : 3 hours

Maximum marks : 75

SECTION A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1. Solve : $y = xp + p^2$.
2. Solve : $(D^2 + 16)y = \cos 4x$.
3. Solve : $(x + z)^2 dy + y^2(dx + dz) = 0$.
4. Solve : $x^2 dx + y^2 dy = z(x + y)$.
5. Find : $L^{-1} \left[\frac{1}{(s-4)^5} + \frac{5}{(s-2)^2 - 5^2} + \frac{s+3}{(s+3)^2 + 6^2} \right]$.
6. Using Laplace transform solve the differential equation $y'' + 4y' + 3y = e^{-t}$ given that $y(0) = 1$; $y'(0) = 0$.

7. Solve : $z = px + qy + 2\sqrt{pq}$.

8. Solve : $(D+1)^2 = e^{-x} \cos x$.

SECTION B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Solve : $y = zp + y^2 p^3$.

10. Solve : $x^2 \frac{d^2 y}{dx^2} + 3x \frac{dy}{dx} - 5y = \cos(\log x)$.

11. Solve : $(mz - ny)dx + (nx - lz)dy + (ly - mx)dz = 0$.

12. Use Charpit method to solve $p^2 + q^2 = npq$.

13. (a) Find $L\left[\frac{1-e^t}{t}\right]$ (b) $L\left[\frac{\cos at}{t}\right]$ does exist. (8 + 2)

14. Find $L^{-1}\left[\frac{s+3}{(s^2+6s+13)^2}\right]$.

15. Solve $z = px + qy + p^2 q^2$.

16. Solve $\frac{d^2 y}{dx^2} + y = \sec x$ by method of variation of parameters.