

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(Effective from the academic year 2019-2020)
B.Sc. Degree Examination – NOV 2021

SUBJECT CODE: 19MT/MC/DE34

DIFFERENTIAL EQUATIONS

Course: Major Core
Max. Marks: 100

Time: 3 Hours

SECTION- A

Answer **ALL** the Questions

(3 x 4 = 12)

1. Brief a geometrical interpretation of a Complete solution of a differential equation.
2. Give a short note on a mathematical modeling of a second-order linear differential equation.
3. Define a partial differential equation and eliminate the arbitrary constants from the equation $z = ax + by + a$.

SECTION- B

Answer any **THREE** Questions

(3 x 16 = 48)

4. Find the solution for the equation $(D^2 - 2D + 4)y = e^x \cos x$.
5. Solve $\frac{dx}{xz} = \frac{dy}{yz} = \frac{2dz}{(x+y)^2}$.
6. Describe the Damped Motion.
7. Find the complete integral for $p^2 + pq = z^2$.

SECTION - C

Answer any **ONE** Question

(1 x 40 = 40)

8. a) Solve $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = x + \sin 2x$.
- b) Solve the equations $\frac{dx}{dt} + y = \sin t + 1$; $\frac{dy}{dt} + x = \cos t$
- c) Solve $\frac{dy}{dt} + y = -3x$,

$$\frac{dx}{dt} + 2x = -2y ; \text{ such that } x = 0 \text{ and } \frac{dy}{dt} = \frac{1}{2} \text{ when } t = 0. \quad (10+15+15)$$

9. a) Obtain the equation governing shape of a hanging cable.
 - b) Solve $z = px + qy + c\sqrt{(1 + p^2 + q^2)}$.
 - c) Solve the following differential equation: $(2D^2D' - 3DD'^2 + D'^3)z = 0$. (14+12+14)
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