RAN-2403000503023001

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B. Sc. (Sem. - III) (NCF - NEP) Examination March - 2025

MH - MJ - 2 - Mathematics

Differential Equations

Time: 1 Hours] **[Total Marks: 25**

સૂચના : / Instructions

(૧) **નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.**
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **B. Sc. (Sem. - III) (NCF - NEP)**

Name of the Subject :

☛ **MH - MJ - 2 - Mathematics Differential Equations**

Subject Code No.: **2403000503023001**

Seat No.:

Student's Signature

(2) All questions are compulsory.

(3) Figures to the right indicate marks of the corresponding question.

Q. 1. Answer the following (Any five) **05**

1. Find the general solution of $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - y = 0$
2. Find Q_1 while solving the differential equation $\frac{d^2y}{dx^2} + \frac{2}{x}\frac{dy}{dx} - n^2y = 0$ by using the method of removal of first-order derivative.
3. Find the known integral of a linear differential equation $\frac{d^2y}{dx^2} + \frac{1}{x}\frac{dy}{dx} - \frac{y}{x^2} = 0$
4. Obtain a partial differential equation by eliminating the arbitrary constants a and b from the relation $z = (x^2 + a)(y^2 + b)$.
5. Find the complete integral of $p + q = pq$.
6. Find the complete integral of $z = px + qy + (p^2 + q^2)$

Q. 2. Answer the following (Any two) **10**

1. Discuss the method to transform a homogeneous linear differential equation with variable coefficients into a linear differential equation with constant coefficients by changing the independent variable.

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2. Solve : $(3x+2)^2 y'' + 3(3x+2)y' - 36y = 3x^2 + 4x + 1$.

3. Solve given ordinary differential equation $x\frac{d^2y}{dx^2} - \frac{dy}{dx} + 4x^3y = x^5$ by changing the independent variable x.

Q. 3. Answer the following (Any two) **10**

1. Obtain the partial differential equation by eliminating the arbitrary functions f and $\varnothing$ from $z = f(ax+by) + \varnothing(ax-by)$.
2. Solve: $p(1+q^2) = q(z-a)$.
3. Discuss the method to solve the first-order non-linear partial differential equation of the form $F(p, q) = 0$.
