2103000203023003
EXAMINATION NOVEMBER 2024
BACHELOR OF SCIENCE (NON-NEP) (THIRD SEMESTER)
(MTH-303-MATHEMATICS-VII)
DIFFERENTIAL EQUATIONS

[Time: As Per Schedule] **[Max. Marks: 50]**

Instructions:
1. Fill up strictly the following details on your answer book
   a. Name of the Examination : **BACHELOR OF SCIENCE(NON-NEP) (THIRD SEMESTER)**
   b. Name of the Subject : **MATHEMATICS PAPER - VII (MTH-303-MATHEMATICS-VII) DIFFERENTIAL EQUATION**
   c. Subject Code No : **2103000203023003**
2. Sketch neat and labelled diagram wherever necessary.
3. Figures to the right indicate full marks of the question.
4. All questions are compulsory.

Seat No:

Student's Signature

Q.1 Answer any Five from the following. **10**

1. Find the general solution of $x^2y'' + 4xy' + 2y = e^x$.
2. Find the solution of a partial differential equation $\sqrt{p} + \sqrt{q} = 1$.
3. Find the general solution of $x^2y'' + y = 0$
4. Find Q1 for the differential equation $y'' - 2tanxy' + 5y = 0$
5. Find general integral of p + q = pq
6. Find one solution $y_1 of\ xy'' - (x+1)y' + y = x^2e^{2x}$
7. Form a partial differential equation from$z = a(x+1) + b$ by elimination arbitrary constants a and b.
8. Find one independent integral of xp + yq = z.

Q.2 Find the general solution of the following differential equations. (ANY TWO) **10**

1. Discuss the method to solve homogeneous linear differential equation with variable coefficients into linear differential equations with constant coefficients by changing the independent variable.
2. Solve: $x^2y'' - (2m-1)xy' + (m^2 + n^2x^m logx)$
3. Solve: $(5+2x)^2y'' + 6(5+2x)^2y' + 8y = 2(2x+5)^2$

Q.3 Attempt any two: **10**

1. Discuss the method to solve second order linear differential equations by the removal of first derivative.
2. Solve: $y'' - \frac{3}{x}y' + \frac{3}{x^2}y = 2x - 1.$
3. Solve: $y'' + cotxy' + (4cosec^2x)y = 0.$

Q.4 Attempt any two : **10**

1. Form a partial differential equation by eliminating arbitrary constants from $(x-h)^2 + (y-k)^2 + z^2 = c^2$;h and k are arbitrary constants.
2. Form a partial differential equation by eliminating arbitrary function from $lx + my + nz = \phi(x^2 + y^2 + z^2)$; ϕ is the arbitrary function.
3. Solve: $x(y^n - y^n)p + y(z^n - x^n)q = z(x^n - y^n).$

Q.5 Attempt any two : **10**

1. Discuss the method to solve the standard form F (z, p, q) = 0.
2. Solve: z - px - qy = 3pq.
3. Solve: $\sqrt{p} + \sqrt{q} = 2x.$

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