



RAN-0955

B.Sc. Sem-IV Examination

March / April - 2019

Mathematics Paper : MCS -403

Differential Equations

Time: 2 Hours]

[Total Marks: 50

सूचना : / Instructions

नीचे दृशविले निशानीवाणी विगतो उत्तरवही पर अवश्य लभवी.
Fill up strictly the details of signs on your answer book

Name of the Examination:

B.Sc. Sem-IV

Name of the Subject :

Mathematics Paper : MCS -403

Subject Code No.: **0 9 5 5**

Seat No.:

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Student's Signature

Instruction:

- (1) Figures to the right indicate marks of corresponding questions.
- (2) Follow usual notations.
- (3) Use of non-programmable scientific calculator is allowed.

Q-1 Do as directed.

[10]

1. Eliminate arbitrary function f from $z = f(x^2 + y^2)$
2. Solve : $p^2 + q^2 = n^2$
3. Solve : $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial x \partial y} = 0$
4. Check weather $y_k = k(k-1) / 2$ is a solution of $y_{k-1} - y_k = k$
5. Solve $4y_{k+2} - 16y_{k+1} + 16y_k = 0$

Q-2 Attempt any TWO.

[10]

1. Solve the difference equation $2y_{k+2} - 5y_{k+1} + 2y_k = 0$ where $y_0 = 0$, $y_1 = 1$. Find particular solution and hence find y_2 .

2. Solve the difference equation $y_{k+4} - 4y_{k+3} + 6y_{k+2} - 4y_{k+1} + y_k = 0$
3. Find the general solution difference equation $3y_{k+2} - 6y_{k+1} + 4y_k = 0$
4. Solve the difference equation $9y_{k+2} - 6y_{k+1} + y_k = 0$ where $y_0 = 0$, $y_1 = 1$. Find particular solution.

Q-3 Attempt any TWO.

[10]

1. Discuss the method of elimination of arbitrary constants.
2. Solve : $\frac{y-z}{yz}p + \frac{z-x}{zx}q = \frac{x-y}{xy}$
3. Solve : $x(y-z)p + y(z-x)q = z(x-y)$
4. Eliminate arbitrary function from ϕ from $lx + my + nz = \phi(x^2 + y^2 + z^2)$

Q-4 Attempt any TWO.

[10]

1. Discuss the method of solving partial differential equation $f_1(x, p) = f_2(y, q)$.
2. Solve: $p^2 + p = q^2$
3. Solve: $z^2(p^2 + q^2) = x^2 + y^2$
4. Solve: $9(p^2z + q^2) = 4$

Q-5 Attempt any TWO.

[10]

1. Discuss the method of solving $\frac{1}{F(D, D)} \sin(ax + by)$
2. Solve: $(D^2 + (D)^2)z = \cos(2x + y)$
3. Solve: $(D^3 - 7D(D)^2 + 6(D)^3)z = 3e^y$
4. Solve: $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} + \frac{\partial^2 z}{\partial y^2} = \sqrt{x + y}$