

2111000303023003
EXAMINATION OCTOBER 2024
BACHELOR OF SCIENCE (COMPUTER SCIENCE)
(NON-NEP) (THIRD SEMESTER)
MATHEMATICS PAPER-VII

[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 (COMPUTER SCIENCE) (NON-NEP) (THIRD SEMESTER)**
 - b. Name of the Subject: **MATHEMATICS PAPER-VII**
 - c. Subject Code No: **2111000303023003**
2. Sketch neat and labelled diagram wherever necessary.
3. Figures to the right indicate full marks of the question.
4. All questions are compulsory.
5. Follow usual notations.
6. Make necessary assumptions wherever necessary.

Seat No:

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Student's Signature

Q.1 Answer any Five of the following:

10

1. Find the particular integral of $y'' + 4y = \sin 3x + e^x$.
2. Write order and degree of a partial differential equation:
$$\frac{\partial^3 z}{\partial^2 x \partial y} + 3x \frac{\partial z}{\partial y} + 3xy = 0.$$
3. Form a partial differential equation from $z = F(x - y)$ by elimination arbitrary function F .
4. Find the solution of a partial differential equation $\sqrt{p} + \sqrt{q} = 1$.
5. Find roots of auxiliary of a differential equation $x^3 y'''' + 3x^2 y'' + xy' + y = 0$ to find Complementary Function.
6. If $z = ae^x + bte^{2t}$, then find $\frac{\partial^2 z}{\partial t^2}$.
7. Find one solution y_1 of $y'' - x^2 y' + xy = x$.
8. Find the general solution of $y'' + y = 0$.

Q.2 Find the general solution of Any Two of the following differential equations: 10

1. $x^2y'' - 7xy' + 12y = x^2;$

2. $x^2y'' + 4xy' + 2y = x^2 + \frac{1}{x^2};$

3. $x^2y'' + 3xy' + y = (\log x)^2 - \log x^2.$

Q.3 Answer Any Two of the following: 10

1. Solve the differential equation $y'' - (1 + x)y' + xy = x$ by the method of solution in terms of known integral.

2. Solve the differential equation $y'' - \frac{2}{x}y' + n^2y = 0$ by the method of removal of the first derivative.

3. Solve the differential equation $y'' + \tan x y' + y \cos^2 x = 0$ by the method of transforming independent variable.

Q.4 Answer Any Two of the following: 10

1. Form a partial differential equation by eliminating arbitrary constants from $z = (x^2 + a)(y^2 + b)$; where a and b are arbitrary constants.

2. Form a partial differential equation by eliminating arbitrary function from $\phi(x + y + z, x^2 + y^2 + z^2) = 0$; where ϕ is the arbitrary function.

3. Find the solution of a given partial differential equation $\frac{\partial^2 z}{\partial x \partial y} = \sin x \sin y$; given that $\frac{\partial z}{\partial y} = -2 \sin y$ when $x = 0$ and $z = 0$ when $y = \frac{\pi}{2}$ by direct integration method.

Q.5 Answer Any Two of the following: 10

1. Solve the Lagrange's partial differential equation:
 $(mz - ny)p + (nx - lz)q = ly - mx.$

2. Solve the Lagrange's partial differential equation:

$$\frac{y-z}{yz}p + \frac{z-x}{zx}q = \frac{x-y}{xy}.$$

3. Solve the following partial differential equations:

1. $z = px + qy - 2\sqrt{pq}$;

2. $z - px - qy = 3pq$.
