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SUBJECT CODE NO: - BB - 2526
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. (CBCGS)(Pattern 2022) S.Y SEM IV
Examination November / December 2025
Mathematics-X Partial Differential Equations

[Time: 1:30 Hours]**[Max. Marks: 40]**

Please check whether you have got the right question paper.

N. B

- 1) All questions are compulsory
- 2) Figures to the right indicate full marks.

Q1 Choose the correct Alternative.**10**

1. A partial differential equation requires
 - a) Exactly one independent variable.
 - b) Two or more independent Variables
 - c) Zero independent variables.
 - d) None of these.
2. The complete integral of $pq=k$ is
 - a) $z = ax + \frac{1}{a}y + c$
 - b) $z = ax + y + c$
 - c) $z = ax + \frac{k}{y}a + c$
 - d) $z = ax + \frac{k}{a}y + c$
3. $\frac{1}{(D-D')^3} \sin(x+y) = \dots\dots\dots$
 - a) $\frac{x^3}{3!} \sin(x+y)$
 - b) $\frac{x^3}{3!} \cos(x+y)$
 - c) $\frac{x^2}{2} \sin(x+y)$
 - d) $\frac{x^2}{2} \cos(x+y)$
4. The complementary function of $(D^2+3DD'+2D'^2)z = x+y$ is
 - a) $f_1(y-x) + f_2(y-2x)$
 - b) $f_1(y+x) + f_2(y+2x)$
 - c) $f_1(y+x) + f_2(y+3x)$
 - d) $f_1(y+x) + f_2(y-2x)$
5. The Particular integral of the equation $(D-D'-2)(D-D'-3)z = e^{3x-2y}$ is
 - a) $6.e^{3x-2y}$
 - b) $\frac{-1}{6} e^{3x-2y}$
 - c) $\frac{1}{6} e^{3x-2y}$
 - d) $\frac{1}{12} e^{3x-2y}$

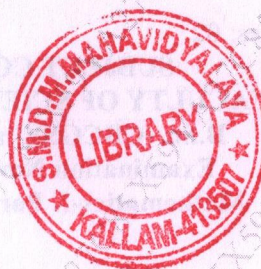
Q2 A) Attempt any one:**08**

- a) Obtain subsidiary equations for the Lagrange's Linear Partial differential equation.
- b) Explain the method of solving partial differential equation of type $f_1(x, p) = f_2(y, q)$.

B) Attempt any one:

07

- c) Solve, $\frac{\partial^2 z}{\partial x^2 \partial y} = \cos(2x+3y)$
 d) Solve, $\sqrt{p} + \sqrt{q} = 1$

**Q3 A) Attempt any one:**

08

- a) Obtain the general solution of non-homogeneous linear partial differential equation, $(D-mD'-a)z=0$.
 b) Solve Laplace equation $\frac{\partial^2 u}{\partial r^2} + \frac{1}{r} \frac{\partial u}{\partial r} + \frac{1}{r^2} \frac{\partial^2 u}{\partial \theta^2} = 0$ by the method of separation of Variables.

B) Attempt any one:

07

- c) Solves $r = a^2 t$
 d) Find the solution of the wave equation $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$ such that $y = P_0 \cos \theta t$ when $x=l$ and $y=0$ when $x=0$.