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SUBJECT CODE NO: - BNP-2690
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. (NEP) (P-2024) S.Y Sem III
Examination November / December 2025
Mathematics (Partial Differential Equations)

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

Please check whether you have got the right question paper.

N. B

1. Question no.1 is compulsory.
2. Attempt any four questions from Q.2 to Q.7
3. Figures to the right indicate full marks.

Part A**Q1 Choose the correct alternative.****10**

i) The partial derivatives P and q correspond to slopes in which directions?

- a) Both in Z-direction.
- b) p in y-direction and q in x-direction.
- c) p in x-direction and q in y-direction.
- d) None of these.

ii) Which of the following describes the geometric interpretation of Lagrange's partial differential equation?

- a) Family of curves in the plane.
- b) Family of surfaces in the space.
- c) Family of lines in the space.
- d) None of these.

iii) The complete integral of $z = px + qy + \log(pq)$ is ----

- a) $Z = ax + by$
- b) $Z = ax - by$
- c) $Z = ax + by - \log(ab)$
- d) $Z = ax + by + \log(ab)$

iv) The complementary function of $(D^2 - 3DD^1 + 2D^{12})Z = 0$ is-----

- a) $Z = \phi_1(y + 2x) + \phi_2(y + x)$
- b) $Z = \phi(y + 2x) - \phi_2(y + x)$
- c) $Z = \phi_1(y - 2x) + \phi_2(y + x)$
- d) $Z = \phi_1(y - 2x) + \phi_2(y - x)$

v) The particular integral of $(D - D^1 - 1)(D - D^1 - 2)Z = e^{2x-y}$ is -----

- a) e^{2x-y}
- b) $\frac{1}{2}e^{2x-y}$
- c) $2e^{2x-y}$
- d) $\frac{1}{2}e^{2x+y}$

Part B

Q2 Explain the method of formation of partial differential equation by elimination of arbitrary constants a and b from the equation $\phi(x, y, a, a, b) = 0$.

5And hence form the partial differential equation from $Z = ax + by$.

- Q3 Solve: $\left(\frac{y^2 z}{x}\right) \cdot P + zxq = y^2$ 5
- Q4 Explain the method of solving partial differential equation of the form $f(z, p, q) = 0$. 5
- Q5 Solve $Z = pq$ by Charpit's method. 5
- Q6 Explain the method for general solution of the homogeneous equation $F(D, D^1)Z = 0$ 5
- Q7 Solve $r + 5s + 6t = 0$ by Monge's method. 5

