
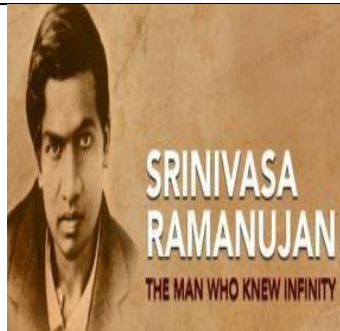


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|  |   | SRM Institute of Science and Technology<br>Kattankulathur   |  |
|  |   | DEPARTMENT OF MATHEMATICS   |  |
|  |   | 18MAB201T- TRANSFORMS AND<br>BOUNDARY VALUE PROBLEMS  |  |
|  |   | UNIT - I Partial Differential Equations<br>Tutorial Sheet - 3   |  |
| Sl. No.  | Questions   |   | Answer   |
| Part - A   |   |   |  |
| 1  | Solve $(D^3 - 3DD' + 2D'^3)z = 0$                     | $z = \varphi_1(y + x) + x\varphi_2(y + x) + \varphi_3(y - 2x)$  |  |
| 2  | Solve $(D^2 - 5DD' + 6D'^2)z = e^{x+y}$               | $z = \varphi_1(y + 2x) + \varphi_2(y + 3x) + \frac{1}{2}e^{x+y}$  |  |
| 3  | Solve $(D^2 - 3DD' + 2D'^2)z = 2 \cosh(3x + 4y)$      | $z = \varphi_1(y + x) + \varphi_2(y + 2x) + \frac{2}{5} \cosh(3x + 4y)$   |  |
| 4  | Solve $(D^3 + D^2D' - DD'^2 - D'^3)z = 3 \sin(x + y)$ | $z = \varphi_1(y + x) + \varphi_2(y - x) + x\varphi_2(y - x) - \frac{3x}{4} \sin(x + y)$                            |  |
| 5  | Solve $(D^2 - DD' - 6D'^2)z = x^2y$                   | $z = \varphi_1(y - 2x) + \varphi_2(y + 3x) + \frac{x^4y}{12} + \frac{x^5}{60}$                                      |  |
| Part - B   |   |   |  |
| 6  | Solve $(D^2 - 2DD' + D'^2)z = x^2y^2e^{x+y}$          | $z = x\varphi_1(y + x) + \varphi_2(y + x) + \left(\frac{y^2}{12} + \frac{xy}{15} + \frac{x^2}{60}\right)x^4e^{x+y}$ |  |
| 7  | Solve $(D^2 + 4DD' - 5D'^2)z = xy + \sin(2x + 3y)$    | $z = \varphi_1(y - 5x) + \varphi_2(y + x) + \frac{x^3y}{6} - \frac{x^5}{30} + \frac{\sin(2x + 3y)}{17}$             |  |
| 8  | Solve $(4D^2 - 4DD' + D'^2)z = 16 \log(x + 2y)$       | $z = x\varphi_1(x + 2y) + \varphi_2(x + 2y) + 2x^2 \log(x + 2y)$  |  |
| 9  | Solve $(D^2 - 5DD' + 6D'^2)z = y \sin x$              | $z = \varphi_1(y + 2x) + \varphi_2(y + 3x) + 5 \cos x - y \sin x$   |  |
| 10   | Solve $(D^2 - DD' - 20D'^2)z = e^{5x+y} \sin(4x - y)$ | $z = \varphi_1(y + 5x) + \varphi_2(y - 4x) + \frac{x}{9}e^{5x+y} - \frac{x}{9} \cos(4x - y)$                        |  |