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SRM
DELHI-NCR CAMPUS, GHAZIABAD (U.P.)

Academic Year: 2023-24 (ODD)

Test : **Internal Examination I** **Date & Session : 14/08/2023 & FN**
Course Code & Title : **21MAB201T&Transforms and Boundary Value Problems** **Duration: 1 Hour**
Year & Sem : **2nd Year & III Sem** **Max. Marks: 30**

Part - A

Answer all questions **(10Q x 1M = 10 Marks)**

Q. No	Question	Marks	BL	CO	PO
1	A complete solution of PDE $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}-z=\frac{\partial z}{\partial x}\frac{\partial z}{\partial y}$ (a) z=ax+by-ab , where a,b are arbitrary constants. (b) $z=x^2+y^2-2ab$, where ab and b are arbitrary constants. (c) $z=ax^2+by^2+abxy$, where a and b are arbitrary constants. (d) z=ax-by+ab , where a,b are arbitrary constants.	1	4	1	1
2	Which of the following statement is correct for the given partial differential equation $\frac{\partial u}{\partial t}+u\frac{\partial u}{\partial x}=\frac{\partial^2 u}{\partial x^2}$ a. It is linear equation of order two. c. It is linear equation of order one. b. It is non- linear equation of order two. d. It is non-linear equation of order one.	1	4	1	2
3	To solve the form of Pp+Qq=R, we form the subsidiary equation of the form: (a) $\frac{dx}{P}=\frac{dy}{Q}=\frac{dz}{R}$, (b) $\frac{dx}{x}=\frac{dy}{y}=\frac{dz}{z}$, (c) $\frac{xdx}{P}=\frac{ydy}{Q}=\frac{zdz}{R}$, (d) $\frac{dx}{P}=\frac{dy}{Q}=\frac{dz}{R}$	1	1	1	2
4	A partial differential equation has (a) one independent variable, (c) two or more independent variables, (b) more than one dependent variable , (d) equal number of dependent and independent variables	1	1	1	1
5	Find the Complementary function of $\left(D^2+DD'-2D'^2\right)z=0$ (a) $z=\phi_1(y-2x)+\phi_2(y-x)$, (c) $z=\phi_1(y-2x)+\phi_2(y+x)$ (b) $z=\phi_1(y+2x)+\phi_2(y+x)$, (d) $z=\phi_1(y+2x)+\phi_2(y-x)$	1	2	1	2
6	The P.I. of $\left(D^3+7DD'^2-6D'^3\right)z=e^{2x+3y}$ (a) $\frac{-1}{28}e^{2x+3y}$, (b) $\frac{-1}{12}e^{2x+3y}$, (c) $\frac{1}{28}e^{2x+3y}$, (d) $\frac{-1}{28}e^{2x+3y}$	1	4	1	2
7	The two sets of Lagrange's multipliers of (3z-4y)p+(4x-2z)q=2y-3x are (a) x,y,z; 2,3,4 (b) $\frac{1}{x},\frac{1}{y},\frac{1}{z}$; 2,3,4(c) x,y,z; 4,2,3 (d) $\frac{1}{x},\frac{1}{y},\frac{1}{z}$; 4,2,3	1	4	1	2
8	The general solution of $\frac{\partial z}{\partial x}P+\frac{\partial z}{\partial y}Q=z$ is (a) $f\left(\frac{x}{y},\frac{y}{z}\right)$ (b) $f\left(\frac{x}{x},\frac{y}{z}\right)$ (c) $f\left(\frac{x}{z},\frac{y}{y}\right)$ (d) $f\left(\frac{x}{x},\frac{y}{y}\right)$	1	4	1	2
9	If the given PDE is of the type F(p,q)=0, its complete solution is given by (a) z=a+bx+c (b) z=ax+by+c (c) $z=ax^2+by^2+c$ (d) z=ax+b+y+cz	1	1	1	2
10	The complete integral of p=4qx is (a) $z=ax^2+ay+c$ (b) $z=2ax^2+ay+c$ (c) $z=ax^2+by+c$ (d) $z=ax^2+by^2+c$	1	4	1	1

Part B

Answer any three questions — **3Q x 4M = 12 Marks**

11	Form the Partial Differential Equation $2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$	4	4	1	2
12	Solve $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6\frac{\partial^2 z}{\partial y^2} = x + y$	4	4	1	2
13	Solve the partial differential equation $\frac{y-z}{yz}p = \frac{z-x}{zx}q = \frac{x-y}{xy}$	4	4	1	2
14	Solve $p\cot x + q\cot y = \cot z$	4	4	1	2

Part C

Answer all questions — **1Q x 8M = 8 Marks**

15.	(A) Solve $\left(D^2 + DD' - 6D'^2\right)z = x^2 \sin(x+y)$	8	4	1	2
	(OR)				
	(B) Obtain the solution of the following equation: $\left(D^3 - 7DD'^2 - 6D'^3\right)z = \cos(x-y) + x^2 + xy^2 + y^3$	8	4	1	2