BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSC **SEMESTER : III**
BRANCH: MATHEMATICS AND COMPUTING **SESSION : MO/2023**

SUBJECT: MA201 PARTIAL DIFFERENTIAL EQUATION

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1	Describe Lagrange's method of finding a solution of a first-order linear partial differential equation. Find a solution of the equation $(y+z)p+(z+x)q=x+y$.	[10]	1	1.10 1.11
Q.2	Describe the method of finding a solution of a homogeneous linear partial differential equation with constant coefficients. Find a solution to the equation $(D^2-DD')z=\cos x \cdot \sin 2y$.	[5]	2	1.10 1.12
Q.3	A tightly stretched flexible string has its end points at $x=0$ and $x=l$. At time $t=0$, the string is given a shape defined by $f(x)=b\,x\,(l-x)$, where b is a constant, and then released. Find the displacement of any point x of the string at any time $t>0$.	[10]	3	1.25 1.30
Q.4	Find the temperature in an infinite bar if the initial temperature is given as $f(x)=U_0$, which is a constant, $\|x\|<1$ and 0 otherwise.	[10]	4	1.25 1.30
Q.5	Derive a solution of a Dirichlet problem for a rectangle. Boundary conditions may be assumed suitably.	[10]	5	1.31 1.32

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