BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2025)

CLASS: BSC **SEMESTER : I**
BRANCH: MATHS & COMP **SESSION : MO/2025**

SUBJECT: MA25111 ORDINARY DIFFERENTIAL EQUATIONS

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Find the values of constant λ such that the differential equation: $(x^2 + y^2 + x)dx + (\lambda xy + e^y)dy = 0$ is exact. Further, for this value of λ, solve the equation.	[2]	1	1
Q.1(b)	Find the orthogonal trajectories of family of curves: $y = mx$, m being a parameter.	[3]	1	1
Q.2(a)	Solve the following differential equation: $x^2p^2 + xyp - 6y^2 = 0$	[2]	1	2
Q.2(b)	Solve the following differential equation: $y = abx + bp^3$	[3]	1	1
Q.3	Evaluate Wronskian of the functions $\sin x$, $\sin x - \cos x$ and hence conclude whether or not they are linearly independent. Also, form the differential equation.	[5]	2	1
Q.4	Solve the following differential equation: $y^{iv} - 3y'' - 4y = e^{2x} + \cos 2x + x^2$	[5]	2	2
Q.5	Solve the following differential equation: $(x^2 D^2 + xD - 1)y = x^2e^{2x}$	[5]	2	2

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