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

CLASS: MSc./IMSC **SEMESTER : I/VII**
BRANCH: PHYSICS **SESSION : MO/2024**

SUBJECT: PH401 MATHEMATICAL METHODS IN PHYSICS

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(a)	State and construct Cauchy's integral theorem.	[5]	1	3
Q.1(b)	Derive the equation of Taylor's series.	[5]		
Q.2(a)	Establish the orthogonality property of Associated Legendre Polynomials.	[5]	2	5
Q.2(b)	Prove the following relation of Bessel function of first kind, using its generating function: $J_{n-1}(x) + J_{n-1}(x) = \frac{2n}{x} J_n(x)$	[5]		
Q.3(a)	Define Fourier and Laplace transforms.	[5]	3	1
Q.3(b)	Find the equation for the instantaneous current when a dc C-R circuit is switched on. Use Laplace transform to get this equation.	[5]		
Q.4(a)	Define symmetric and antisymmetric tensors.	[5]	4	1
Q.4(b)	Make short note on 'Dyad'.	[5]		
Q.5(a)	Illustrate the elementary properties of a group with example.	[5]	5	2
Q.5(b)	Compare two groups which are isomorphic to each other.	[5]		

::::::20/11/2024::::::E