BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO 2022)

CLASS: BARCH **SEMESTER: I**
BRANCH: ARCH **SESSION: MO/2022**

SUBJECT: MA104 MATHEMATICS FOR ARCHITECTS
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 rank of the matrix A where $A=\begin{pmatrix}1 & 2 & -1\\ 2 & 4 & 2\\ 3 & 7 & 3\end{pmatrix}$.	[2]	M1, CO1, CO3,	L1
Q.1(b)	Test for consistency and solve: 5x + 3y + 7z = 4, 3x + 26y + 2z = 9, 7x + 2y + 10 z = 5.	[3]	M1, CO1, CO3	L1
Q.2(a)	Verify Cayley-Hamilton theorem for the matrix A= $\begin{bmatrix}1 & 4\\ 2 & 3\end{bmatrix}$.	[2]	M1, CO1, CO3,	L1
Q.2(b)	Find the Eigen values and Eigen vectors for the following matrix: $\begin{bmatrix}8 & 2\\ -4 & 2\end{bmatrix}$.	[3]	M1, CO1, CO3,	L1
Q.3(a)	Using rank method, solve the equations: $x+y+z=6; x+2y+3z=14; 2x+4y+7z=30$	[2]	M1, CO1, CO3,	L1
Q.3(b)	Find the n-th derivative of $\sin 6x \cos 4x$.	[3]	M2, CO1, CO3,	L1
Q.4(a)	Find the nth derivative of $x^2 \cos x$.	[2]	M2, CO1, CO3,	L1
Q.4(b)	Evaluate $\lim_{x\to\pi/2}(\sin x)^{\tan x}$.	[3]	M2, CO1, CO3,	L1
Q.5(a)	Expand $e^{\sin x}$ by Maclaurin's series upto the term containing x^4 .	[2]	M2, CO1, CO3,	L1
Q.5(b)	Using integral calculus, Find the area of a circle of radius "a".	[3]	M2, CO1, CO3,	L1

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