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

CLASS: B.ARCH **SEMESTER : I**
BRANCH: ARCH **SESSION : MO/2024**

SUBJECT: MA104 MATHEMATICS FOR ARCHITECTS

TIME: 02 Hrs. **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 A=$\begin{bmatrix}1 & 2 & 3\\1 & 4 & 2\\2 & 6 & 5\end{bmatrix}$.	[2]	CO1	1
Q.1(b)	Compute Adj *A* and A^{-1}. $A=\begin{bmatrix}2 & 1 & 2\\3 & 2 & 2\\1 & 2 & 3\end{bmatrix}$.	[3]	CO1	1
Q.2(a)	Show that the given matrix satisfies its characteristic equation. A= $\begin{bmatrix}3 & 6\\1 & 2\end{bmatrix}$.	[2]	CO1	2
Q.2(b)	Solve the system $x_1+2x_2+x_3=3$, $3x_1-x_2-3x_3=-1$, $2x_1+3x_2+x_3=4$	[3]	CO1	2
Q.3(a)	Find the nth derivative of $sin^4\theta$.	[2]	CO2	2
Q.3(b)	Find the nth derivative of $x\log_e x$.	[3]	CO2	2
Q.4(a)	Expand $log_e x$ in powers of $(x-1)$ and hence evaluate $log_e 1.2$ correct to 4 decimal places.	[2]	CO2	2
Q.4(b)	Evaluate $\lim_{x\to 0}\frac{\theta-sin\theta}{sin\theta(1-cos\theta)}$	[3]	CO2	2
Q.5	If $z=f(x,y)=x^4y^3+8x^2y+y^4+5x$, then find $\frac{\partial z}{\partial x},\frac{\partial z}{\partial y},\frac{\partial^2 z}{\partial x^2},\frac{\partial^2 z}{\partial y^2} and \frac{\partial^2 z}{\partial x\partial y}$.	[5]	CO3	1

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