

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

CLASS: B.ARC
BRANCH: ARC

SEMESTER : I
SESSION : MO/2025

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
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- Q.1 Find the rank of the following matrices [5] CO 1 BL 1
- $$\begin{bmatrix} 7 & -2 & 1 & -2 \\ 0 & 2 & 6 & 3 \\ 7 & 2 & 13 & 4 \\ 7 & 0 & 7 & 1 \end{bmatrix}.$$
- Q.2 Show that the given matrix satisfies its characteristic equation. [5] CO1 2
- $$A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}.$$
- Q.3 Test whether the following system of equations is consistent or inconsistent: $5x - y + 3z = 6$, $x + 2y = 4$, $2x - y + 5z = 2$. If consistent, find a general solution. [5] CO1 2
- Q.4(a) Find the nth derivative of $\sin\theta\cos\theta$. [2] CO2 2
- Q.4(b) Find the nth derivative of $x \sin x$. [3] CO2 2
- Q.5(a) Evaluate $\int_x^{\pi/2} (\sec x - \tan x)$ [2] CO2 2
- Q.5(b) Find the area bounded by the curves $y = x^2$ and the line $y = x$. [3] CO2 2

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