

No. of Printed Pages : 2 **MMT-008(P)(Set-I)**

**M. SC. (MATHEMATICS WITH  
APPLICATIONS IN COMPUTER  
SCIENCE) [M. SC. (MACS)]**

**Term-End Practical Examination**

**June, 2025**

**MMT-008(P)(Set-I) : PROBABILITY AND  
STATISTICS (PRACTICAL)**

*Time :  $1\frac{1}{2}$  Hours*

*Maximum Marks : 40*

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**Note :** (i) There are **two** questions in this paper, totaling 30 marks. Answer both of them.

(ii) Remaining 10 marks are for viva-voce.

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1. Let  $X \sim N_4(\bar{\mu}, \Sigma)$ , where

$$\bar{\mu} = \begin{bmatrix} 2 \\ 4 \\ 1 \\ -3 \end{bmatrix}, \quad \Sigma = \begin{bmatrix} 8 & 0 & 1 & 0 \\ 0 & 3 & 0 & 0 \\ 1 & 0 & 5 & 0 \\ 0 & 0 & 0 & 8 \end{bmatrix}$$

**[ 2 ]**

Write a program in 'C' language to find :

- (i) Marginal distribution of  $\begin{bmatrix} x_1 \\ x_3 \end{bmatrix}$ .
- (ii) Conditional distribution of  $\begin{bmatrix} x_2 \\ x_4 \end{bmatrix}$  given

$$\begin{bmatrix} x_1 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ -4 \end{bmatrix}.$$

- (iii) Correlation coefficient between  $x_2$  and  $x_4$ . 15

2. Write a 'C' program to fit a model  $y = b_0 + b_1x_1 + b_2x_2$  for  $n \leq 20$  observations.

Extend your program for the data : 15

$y_n$	$x_{1n}$	$x_{2n}$
1	1	0
2	0	2
3	-1	-1
4	-4	-2
5	-6	5
6	-5	6
7	-3	3
8	2	-2
9	10	-4
10	5	5

x x x x x