M.Sc. (Mathematics with Applications in Computer Science)
Term End Examination
December 2020
MMT-008(P), Probability and Statistics

Time allowed: 1½ hours ***Maximum Marks 40***

Note:

1) The question paper has two questions worth 40 marks each. Attempt both of them.

2) Write program in C language in your answer booklet.

3) All symbols used have their usual meaning.

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1) Consider $\mathbf{y} \sim N_4(\mu, \mathbf{\Sigma})$. Write a program in 'C' language to obtain the conditional distribution of $\begin{bmatrix} y_1 \\ y_3 \end{bmatrix}$ for given $\begin{bmatrix} y_2 \\ y_4 \end{bmatrix}$. Also, extend your program for (20)

$$\mu = \begin{bmatrix} 1 \\ 2 \\ -1 \\ 3 \end{bmatrix}, \mathbf{\Sigma} = \begin{bmatrix} 1 & 2 & 4 & 0 \\ 2 & 3 & 1 & 5 \\ 4 & 1 & 2 & 1 \\ 0 & 5 & 1 & 8 \end{bmatrix} \text{ and } \begin{bmatrix} y_2 \\ y_4 \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}.$$

2) Write a 'C' program to fit a model $y = b_0 + b_1 x_1 + b_2 x_2$ for $n \leq 20$ observations. Extend your program for the data (20)

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