MCA (LATERAL) (Sample Paper - 2)
(SEM IV) THEORY EXAMINATION
FUNDAMENTAL OF DATA STRUCTURE, NUMERICAL & COMPUTATIONAL THEORY (RCA - A02)

Time: 3 Hours  Total Marks: 70

## SECTION-A

Q-(1.) Attempt all questions in brief: 2×7=14

(a.) What are arrays?
(b.) Define Insertion Sort.
(c.) Define Bubble Sort.
(d.) What is Binary Search Tree?
(e.) Define curve fitting
(f.) What do you mean by algorithm?
(g.) Explain principle of Least Squares.

## SECTION-B

Q-(2.) Attempt any three of following: 7×3=21

(a.) What are Linked Lists? Explain.
(b.) By method of least squares, find straight line that best fits following data:

| X | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Y | 1.0 | 1.8 | 3.3 | 4.5 | 6.3 |

(c.) Define chomsky Hierarchy.
(d.) Define Turing machine model.
(e.) Explain phases of errors in compiler.

## SECTION-C

Q-(3.) Attempt any one part of following: 7×1=7

(a.) What is data structure & its types?
(b.) Define Two-way Merge Sort.

Q-(4.) Attempt any one part of following: 7×1=7

(a.) Define Two-way Header List.

(b.) Define Heap Sort with example.

Q-(5.) Attempt any one part of following: 7×1=7

(a.) Define Data-type and its types.

(b.) What are regressions? Explain Linear & Non-Linear Regressions.

Q-(6.) Attempt any one part of following: 7×1=7

(a.) Write an algorithm for fitting a straight line of form $y = a+bx$ for a given set of data points.

(b.) Define chi-square Test with its applications.

Q-(7.) Attempt any one part of following: 7×1=7

(a.) Draw NFA for Regular Expression $ab^*/ab$.

(b.) What are forecasting models and why these models are used?