

**5775**

**FACULTY OF SCIENCE**  
**B.Sc. (V Semester) Examination**  
**DATA STRUCTURES AND ALGORITHMS**  
(Data Science)  
**Paper VI**  
(General Elective)

*Time : 3 Hours]*

*[Max. Marks : 80*

**Section A** – (Marks:  $8 \times 4 = 32$ )

1. Answer any **eight** questions:
  - (a) Distinguish between space and time complexity.
  - (b) What is meant by sparse matrix? Discuss in brief.
  - (c) Give a brief note on Hashing using an example.
  - (d) Define a Tree data structure. Write down its properties.
  - (e) List the properties of a Binary Tree.
  - (f) Discuss about the Binary Search Tree.
  - (g) How is a graph different from Tree? Discuss.
  - (h) Write about the Spanning Tree. List the algorithms that find Spanning Tree.
  - (i) Discuss in brief about Breadth First Search technique.
  - (j) Explain the difference between Searching and Sorting with an example.
  - (k) Write about Linear Search technique. Also give its time complexity.
  - (l) Give a short note on the “Divide and Conquer” method.

**Section B** – (Marks:  $4 \times 12 = 48$ )

*Answer all the questions.*

2. (a) Define Single Linked List. Explain about its representation and the operations that can be performed on it.

Or

(b) Explain the ways of implementing the stack and show their representation with the help of a neat sketch.
  3. (a) Write the recursive algorithms for the traversals in Binary Tree.

Or

(b) Explain about B-Tree with the help of neat sketches.
  4. (a) Explain the various ways of representing the graphs with neat diagrams.

Or

(b) Explain the steps of Dijkstra algorithm that find the shortest path.
  5. (a) Write in detail about the Binary Search algorithm. Give its time complexity.

Or

(b) List and explain the steps of the “Merge Sort” algorithm.
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