

Roll No.

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Paper ID [A0209]

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B.C.A. (204) (OLD/S05) (Sem. - 2nd)**DATA STRUCTURES****Time : 03 Hours****Maximum Marks : 75****Instruction to Candidates:**

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Nine** questions from Section - B.

Section - A*(15 × 2 = 30)***Q1)**

- a) What is Big-O notation?
- b) Explain the concept of space-time tradeoff.
- c) What is recursion?
- d) Write the prefix and postfix equivalent of the following infix expression:
A *B+C.
- e) What is the difference between the ordinary and priority queues?
- f) What is the condition for the overflow in the linked lists?
- g) What do you mean by the term garbage collection?
- h) What is the difference between binary search trees and heaps?
- i) List any two applications of trees.
- j) What is the condition of overflow in the linked list?
- k) What do you mean by the term “merging of two arrays”?
- l) Consider the following elements. 1,5,3,0,9,17,10,8. Calculate the position and the element where this list split into two in quick-sort algorithm.
- m) Give the average complexity of linear and binary search algorithms.
- n) Consider the following list: 1, 5, 8, 12, 15. How many comparisons will you require using binary search algorithm to find that 12 is at position 4 in the list.
- o) What is the average complexity of heap-sort algorithm?

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Section - B**(9 × 5 = 45)**

- Q2)** What is the difference between data and information? Explain any 4 data structures.
- Q3)** Write short note on: A. Algorithm complexity B. Space-time tradeoff
- Q4)** What is the difference between stacks and queues? Give algorithm for push and pop operations of stack.
- Q5)** Give algorithm to convert infix notation to postfix notation.
- Q6)** Explain the algorithm to insert a new node at the beginning of a linked list.
- Q7)** Write a program or give an algorithm to implement heap-sort algorithm.
- Q8)** Write short notes on:A. dynamic storage management B. Garbage collection.
- Q9)** Write a program or give an algorithm to delete a node from the end of the linked list.
- Q10)** Give algorithm for the pre-order traversal of binary search trees using stacks.
- Q11)** Give any two differences between linear and binary search algorithm. Explain binary search algorithm in details.
- Q12)** Give quick-sort algorithm and write down its average complexity.
- Q13)** Write an algorithm/program to implement selection sort.

