

Roll No.

Total No. of Questions : 13]

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Paper ID [A0209]

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BCA (204) (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

Q1)

(15 × 2 = 30)

- a) What is space time complexity?
- b) Distinguish between data and information.
- c) What is push operation of stack?
- d) Write the prefix and postfix equivalent of the following infix expression:
A * B+C.
- e) What is the difference between the stack and queue?
- 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 heap?
- i) List any two applications of linked lists.
- j) What is the average complexity of bubble-sort algorithm?
- k) What do you mean by the term “merging of two arrays”?
- l) Consider the following elements. 66, 55, 88, 22, 33, 54. Calculate the position and the element where this list split into two in quick-sort algorithm.
- m) Give the average complexity of selection-sort and heap-sort 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 binary search algorithm?

Section - B

(9 × 5 = 45)

- Q2)** What are data structures? Explain any 5 data structures.
- Q3)** Write short note on:
(a) Algorithm complexity
(b) Space-time tradeoff
- Q4)** Write an algorithm to insert and delete an element from the circular queue.
- Q5)** Use the infix to postfix conversion algorithm to convert an infix expression $a+b*c/(e+f*g)$ to postfix expression. Verify the result directly.
- Q6)** Explain the algorithm to insert a new node after a target node in the linked list.
- Q7)** Write a program or give an algorithm to implement quick-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 beginning of the linked list.
- Q10)** Give algorithm for the in-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 insertion-sort algorithm and write down its average complexity.
- Q13)** Write an algorithm/program to implement selection sort.

