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Paper Code : PCC- CSBS301/PCC-CS301   Data Structure & Algorithms
UPID : 003443

Time Allotted : 3 Hours

Full Marks :70

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following :   [1 x 10 = 10]

   (I)   What is the time complexity of an infix to postfix conversion algorithm?

   (II) Which of the following is essential for converting an infix expression to postfix notation ?

   (III) A data structure is a particular way of ----------and --------data either in computer's memory or on the disk storage so that it can be used efficiently.

   (IV) ---------- is not a stable sorting algorithm?

   (V)   Time complexity of bubble sort in best case is------------

   (VI) When a sorting technique is called stable?

   (VII) What is the search complexity in direct addressing?

   (VIII) What is the best case for linear search?

   (IX) Reverse Polish notation is often known as-------

   (X)   The values in a BST can be sorted in ascending order by using which of the traversals method?

   (XI) Which notation comprises a set of all functions h(n) that are greater than or equal to cg(n) for all values of $n \geq n0$?

   (XII) A circular queue is implemented using an array of size 10. The array index starts with 0, front is 6, and rear is 9. The insertion of next element takes place at the array index.

Group-B (Short Answer Type Question)
Answer any three of the following   [5 x 3 = 15]

2. Write an algorithm for binary search technique.   [5]

3. State the differences between stack and queue data structure.   [5]

4. Convert the following infix expression into postfix expression using the stack data structure with detailed explanation : A – (B / C + (D % E * F) / G)* H   [5]

5. Show how the following polynomial can be represented using a linked list.   [5]
   7x2 y2 - 4x2 y+5xy2 -2 . https://www.makaut.com

6. Write difference between b tree and b+ tree.   [5]

Group-C (Long Answer Type Question)
Answer any three of the following   [15 x 3 = 45]

7. (a) Why circular queue is better than simple queue?   [3]

   (b) Evaluate the postfix expression using stack: 2 3 1 * + 9 –   [4]

   (c) Write a program to convert infix expression to its equivalent postfix expression using stack.   [8]

8. Write the advantages disadvantages and uses of a circular linked list.   [15]

9. (a) What are the best worst and average case time complexity of binary search algorithm?   [3]

   (b) How linear search is differing from binary search?   [5]

   (c) What are the preconditions for performing binary search in an array?   [2]

   (d) Write a C program for linear search in an array.   [5]

10. (a) What is a Stack ADT ? Explain their operations.   [8]

    (b) Write an algorithm to delete an item from a circular array of queue. Also find the complexity of the algorithm.   [7]

11. (a) Define algorithm.   [2]

    (b) What are the measures of performance of an algorithm? Explain.   [5]

    (c) Define asymptotic notation and explain each types.   [8]