

Total No. of Questions : 9]  
(1065)

[Total No. of Printed Pages : 4

**BCA (CBCS) IInd Semester Examination**

**989**

**DATA STRUCTURES**

**BCA-204**

**Time : 3 Hours]**

**[Maximum Marks : 50**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

*Note :- Attempt Five questions in all. Select one question each from Unit I, II, III and IV. Q. No. 9 in Unit-V is compulsory. All questions carry equal marks.*

**Unit-I**

1. (a) What is Data Structure ? Explain different types of data structure with example.  
(b) What is Algorithm Complexity ? How you represent time complexity in term of big 'O' notation ?
2. (a) What is Linear Array ? Write an algorithm to insert an element in ordered list.  
(b) What is Sequential Search ? Write algorithm of sequential search. Find its all case complexities.

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## Unit-II

3. (a) Write an algorithm to insert an element at end of linked list. Also find its complexity.
- (b) Write an algorithm to insert an ITEM before a given location in a Doubly Linked List.
4. (a) Write the algorithm to copy a linked list into another linked list.
- (b) What is Circular Linked List ? What are its advantages over singly linked list ?

## Unit-III

5. (a) Write an algorithm to evaluate Postfix Expression and implement the algorithm on the following Postfix Expression :

(b) What is Circular Queue ? How you will implement it ?

6. (a) Write an Algorithm to convert infix expression into postfix expression and implement the Algorithm on the following Infix Expression :

$$5 + 2^3 - 10 / 2 * 4 + 10$$

- (b) What are the various applications of Stack in Computers ?

## Unit-IV

7. (a) Write an algorithm to sort the singly linked list by using bubble sort. Count the number of interchanges and also find its complexity.

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- (b) Write an algorithm for POST ORDER traversal in a Binary Tree.

8. (a) How Binary Tree is different from BST (Binary Search Tree) ? Write an algorithm for deletion in BST.
- (b) Write an algorithm for sorting the data by using quick sort sorting technique.

## Unit-V

9. Write short notes on the following :
  - (i) If the address of A [1, 1] and A [2, 1] are 1000 and 1010 respectively and each element occupies 2 bytes, then the array has been stored in ..... major order.

- (ii) Complexity of inserting an element in Array is. ....

- (iv) The following sequence of operation is performed on a stack. Push (1), Push (2), Pop, Push (1), Push (2), Pop, Pop, Push (2), Pop. The sequences of popped out values are.
- (v) A postfix expression is merely the reverse of the prefix expression. (True/false)

- (vi) The correct push function is :

- (a)  $S \rightarrow \text{arr}[S \rightarrow \text{top} + 1] = \text{data}$
- (b)  $S \rightarrow \text{arr}[\text{++}S \rightarrow \text{top}] = \text{data}$
- (c)  $S \rightarrow \text{arr}[\text{++}(S \rightarrow \text{top})] = \text{data}$
- (d) None of these

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Turn Over



(vii) Strictly Binary Tree.

(viii) Full Binary Tree.

(ix) Complete Binary Tree.

(x) What is the maximum size of the operator stack during the conversion of the Infix expression  $A + B * C - D/E$  to postfix ?