



BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme – Bachelor of Computer Applications

Course Name - Data Structure and Algorithm

Course Code - BCAC202 / BCA202

(Semester – 2)

Time allotted: 3 Hours

Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question)

10 x 1 = 10

1. *Choose the correct alternative from the following*
 - (i) Which among the following belongs to the category of a Pre-order Traversal?
 - a. Root -> Left Sub Tree -> Right Sub Tree
 - b. Root -> Right Sub Tree -> Left Sub Tree
 - c. Right Sub Tree -> Left Sub Tree -> Root
 - d. Left Sub Tree -> Right Sub Tree -> Root
 - (ii) The operation of processing each element in the list is known as, _____.
 - a. Sorting
 - b. Merging
 - c. Traversal
 - d. Inserting
 - (iii) To represent hierarchical relationship between elements, Which data structure is suitable?
 - a. Dequeue
 - b. Tree
 - c. Priority
 - d. Graph
 - (iv) A binary tree whose every node has either zero or two children is called
 - a. Complete binary tree.
 - b. Binary search tree.
 - c. Extended binary tree.
 - d. None of these
 - (v) The number of interchanges required to sort 5, 1, 6, 2, 4 in ascending order using Bubble Sort is
 - a. 5
 - b. 7
 - c. 6
 - d. 8

- (vi) From where does the insertion and deletion of elements get accomplished in Queues?
- a. Front & Rear ends respectively
 - b. Rear & Front ends respectively
 - c. Only Front ends
 - d. Only Rear ends
- (vii) Which linear structure has a provision of Last-In-First-Out (LIFO) mechanism for its elements?
- a. Stack
 - b. Queue
 - c. Both a & b
 - d. None of the above
- (viii) The postfix form of $A*B+C/D$ is
- a. $*AB/CD+$
 - b. $AB*CD/+$
 - c. $A*BC+/D$
 - d. $ABCD+/*$
- (ix) The complexity of searching an element from a set of n elements using Binary search algorithm is
- a. $O(n^2)$
 - b. $O(\log n)$
 - c. $O(n)$
 - d. $O(n \log n)$
- (x) A linear list in which each node has pointers to point to the predecessor and successors nodes is called as
- a. Singly Linked List.
 - b. Doubly Linked List.
 - c. Circular Linked List.
 - d. Linear Linked List.

Group – B

(Short Answer Type Questions)

3 x 5 = 15

Answer any *three* from the following

2. What is Insertion sort? Sort the following array step by step using insertion sort algorithm. 5
14, 52, 17, 32, 20, 56, 80, 10.
3. Explain various data structure operations. 5
4. Write an algorithm to insert a node at the end of the circular linked list. 5
5. Write an algorithm to insert a node at the end of the doubly linked list. 5
6. What do you mean by complexity of an algorithm? Explain the meaning of worst case analysis and best case analysis with an example. 5

Group – C

(Long Answer Type Questions)

3 x 15 = 45

Answer any *three* from the following

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|-----|-----|--|---|
| 7. | (a) | Write an algorithm to insert a node P at the end of a linked list. | 7 |
| | (b) | Write an algorithm to convert an infix expression into postfix expression. | 8 |
| 8. | (a) | Write down any two application of a queue. | 2 |
| | (b) | Write down PUSH and POP algorithm of queue. | 8 |
| | (c) | Write down the algorithm of linear search. | 5 |
| 9. | (a) | Construct a tree using inorder and postorder traversals
Inorder : 2, 3,4, 5, 6, 7, 8 , 9, 11,12,15,19,20.
Postorder : 3,2, 5, 6, 4, 8, 11,9, 15,20,19,12,7. | 9 |
| | (b) | Write down various differences between linear and non-linear data structure. | 4 |
| | (c) | Write down any two applications of a circular queue. | 2 |
| 10. | (a) | Consider the following eight numbers 50, 30, 40, 20, 70, 35, 60 and 40.
Display the construction of the binary search tree by inserting the above numbers in the given order. | 7 |
| | (b) | Write down push and pop algorithm of queue. | 8 |
| 11. | | Write a short note (any <i>three</i>) | |
| | (a) | Sequential file | 5 |
| | (b) | Random access file | 5 |
| | (c) | Priority Queue | 5 |
| | (d) | AVL tree | 5 |
| | (e) | Hashing | 5 |
| | (f) | Heap Tree | 5 |