



**BRAINWARE UNIVERSITY**

**Term End Examination 2019 - 20**

**Programme – Bachelor of Technology in Computer Science & Engineering**

**Course Name – Data structure and Algorithms**

**Course Code – PCC-CS301**

(Semester – 3)

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)

20 x 1 = 20

1. *Choose the correct alternative from the following (Answer any Twenty)*
  - (i) Finding the location of a given item in a collection of items is called
 

a. Discovering	b. Finding
c. Searching	d. Mining
  - (ii) What is the worst case time complexity of linear search algorithm?
 

a. $O(1)$	b. $O(\log n)$
c. $O(n)$	d. None of these
  - (iii) Arrays are best data structures
 

a. for relatively permanent collections of data	b. for the size of the structure and the data in the structure are constantly changing
c. for both of above situation	d. for none of above situation
  - (iv) If the array is already sorted, which of these algorithms will exhibit the best performance
 

a. Merge sort	b. Insertion sort
c. quicksort	d. heap sort
  - (v) What is the postfix expression for the corresponding infix expression?  
 $a+b*c$ 

a. $ab+c*$	b. $abc+*$
c. $a+bc*$	d. $abc*+$



- (xvii) The complexity of Bubble sort algorithm is
- |             |                  |
|-------------|------------------|
| a. $O(n)$   | b. $O(\log n)$   |
| c. $O(n^2)$ | d. $O(n \log n)$ |
- (xviii) In C, what are the basic loops required to perform an insertion sort?
- |                  |               |
|------------------|---------------|
| a. do- while     | b. if else    |
| c. for and while | d. for and if |
- (xix) The given array is arr = {3,4,5,2,1}. The number of iterations in bubble sort is,
- |      |      |
|------|------|
| a. 5 | b. 4 |
| c. 2 | d. 1 |
- (xx) Process of removing an element from stack is called \_\_\_\_\_
- |               |         |
|---------------|---------|
| a. Create     | b. Push |
| c. Evaluation | d. Pop  |
- (xxi) Which data structure is needed to convert infix notation to postfix notation?
- |           |          |
|-----------|----------|
| a. Branch | b. Tree  |
| c. Queue  | d. Stack |
- (xxii) Which of the following is true?
- |   |  |
|---|--|
| a. A graph may contain many edges and no vertices | b. A graph must contain at least one vertex. |
| c. A graph may contain no edges and no vertices   | d. None of these                             |
- (xxiii) Extended tree is also called
- |            |            |
|------------|------------|
| a. 2 -Tree | b. 3 -Tree |
| c. 4 -Tree | d. 5 -Tree |
- (xxiv) The pointer variable head or start in linked list stores the address of the
- |                 |                  |
|-----------------|------------------|
| a. First Node   | b. Last Node     |
| c. Both a and b | d. None of these |
- (xxv) Which among the following belongs to the category of an In-Order Traversal?
- |  |   |
|--|---|
| a. Root -> Left Sub Tree -> Right Sub Tree | b. Right Sub Tree -> Left Sub Tree ->Root |
| c. Root -> Right Sub Tree -> Left Sub Tree | d. Right Sub Tree -> Left Sub Tree ->Root |

**Group – B**

(Short Answer Type Questions)

4 x 5 = 20

Answer any *four* from the following

- |    |   |     |
|----|---|-----|
| 2. | Write an algorithm to perform PUSH and POP operation. Explain the algorithm with suitable examples.   | 3+2 |
| 3. | Suppose the following six numbers are inserted in order into an empty binary search tree T: 50, 77, 30, 66, 40, 33. Draw the tree T by describing each step of insertion. | 5   |
| 4. | Write down the algorithm of BFS technique.  | 5   |
| 5. | Explain Division method in Hashing.   | 5   |
| 6. | Define Algorithm. State the characteristics of an algorithm   | 2+3 |
| 7. | Explain Binary Search Tree with an example.   | 5   |

**Group – C**

(Long Answer Type Questions)

3 x 10 = 30

Answer any *three* from the following

- |     |  |    |
|-----|--|----|
| 8.  | (a) Translate the following infix expression into its equivalent postfix expression: $A + B * D - E + F$ .   | 5  |
|     | (b) What is the difference between Stack and Queue Data Structure?   | 5  |
| 9.  | Construct the AVL tree for a calendar where nodes are entering in the following order-<br>MARCH, MAY, NOVEMBER, AUGUST, APRIL, JANUARY, DECEMBER, JULY, FEBRUARY, JUNE, OCTOBER AND SEPTEMBER. | 10 |
| 10. | (a) White down the advantages of Circular List over Singly Linked List.  | 5  |
|     | (b) Write an algorithm to delete a node from the last position of a singly linked list.  | 5  |
| 11. | (a) Compare single, Double and Circular Linked List with logical structure.  | 5  |
|     | (b) When a stack can be considered as empty?   | 5  |
| 12. | Write short notes:   |    |
|     | (a) Algorithm: Complexity  | 5  |
|     | (b) B Tree   | 5  |