BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – BCA-2022
Course Name – Data Structures
Course Code - BCAC202
(Semester II)

Full Marks : 60   **Time : 2:30 Hours**

[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)   1 x 15=15

1. *Choose the correct alternative from the following :*

(i) If the size of the stack is 10 and we try to add the 11th element in the stack then the condition is known as

a) Underflow	b) Garbage value
c) Overflow	d) None of these

(ii) If for an algorithm time complexity is given by O(n) then what is it?

a) constant	b) linear
c) exponential	d) none of the mentioned

(iii) 6, 8, 4, 3, and 1 are inserted into a data structure in that order. An item is deleted using only a basic data structure operation. If the deleted item is a 1, the data structure cannot be a ?

a) Queue	b) Tree
c) Stack	d) None

(iv) Show the disadvantages of arrays is-

a) Data structure like queue or stack cannot be implemented	b) There are chances of wastage of memory space if elements inserted in an array are lesser than the allocated size
c) Index value of an array can be negative	d) Elements are sequentially accessed

(v) Finding the location of a given item in a collection of items is called

a) Discovering	b) Finding
c) Searching	d) Mining

(vi) Predict when you push a new node onto a stack

a) The new node is placed at the front of the linked list	b) The new node is placed at the back of the linked list

c) The new node is placed at the middle of the linked list

d) No Changes happens

(vii) The term push and pop is related to

a) Array

b) Lists

c) Stacks

d) Trees

(viii) When a top-down approach of dynamic programming is applied to a problem, it usually _____

a) Decreases both, the time complexity and the space complexity

b) Decreases the time complexity and increases the space complexity

c) Increases the time complexity and decreases the space complexity

d) Increases both, the time complexity and the space complexity

(ix) Complexity of the recurrence relation $T(n)=8T(n/2)+n2$ is

a) $O(n)$

b) $O(n^2)$

c) $O(n^3)$

d) none of these

(x) The time complexity of the solution tower of hanoi problem using recursion is _____

a) $O(n^2)$

b) $O(2^n)$

c) $O(n \log n)$

d) $O(n)$

(xi) linear structure has a provision of Last-In-First-Out (LIFO) mechanism for its elements?

a) Stack

b) Queue

c) Stack & Queue

d) none

(xii) Choose the Oparetion where the retrieval of items in a stack is

a) Push

b) Pop

c) Retrieval

d) access

(xiii) If the array is already sorted, then Predict which of these algorithms will exhibit the best performance

a) Merge sort

b) Bubble sort

c) Insertion sort

d) None

(xiv) Full binary tree is-

a) Each node has exactly zero or two children

b) Each node has exactly two children

c) All the leaves are at the same level

d) Each node has exactly one or two children

(xv) To obtain a prefix expression, Select which of the tree traversals is used?

a) Level-order traversal

b) Pre-order traversal

c) Post-order traversal

d) In-order traversal

Group-B
(Short Answer Type Questions)

3 x 5=15

2. what are the types of Notation used for Time Complexity? (3)

3. Calculate the postfix forms of the expression? K + L - M*N + (O^P) * W/U/V * T + Q (3)

4. Explain the characteristics of an Array (3)

5. Construct a sorted list step by step using Quick sort for the given unsorted list: 19 17 15 12 16 18 4 11 13 (3)

6. Justify the advantages of AVL tree over binary search tree (3)

OR

establish binary search tree with proper example (3)

Group-C
(Long Answer Type Questions)

5 x 6=30

7. What is characteristics of algorithm (5)
8. Summarize few of the Application of tree data-structure (5)
9. Distinguish between Time complexcity and Space complexity (5)
10. Illustrate a bubble sort step by step for the following data:7 20 5 15 10 4 33 2 25 6 (5)
11. Write down the difference between a tree and a binary tree. (5)
12. Conclude pseudo code to search a element in binary search (5)

<div align="center">OR</div>

differentiate between binary search and interpolation search (5)

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