

বিদ্যাসাগর বিশ্ববিদ্যালয়

VIDYASAGAR UNIVERSITY

BCA

2nd Semester Examination 2022

DATA STRUCTURE

PAPER-1202

Full Marks : 100

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group – A

Answer any *four* questions. 4×15

- (a) What do you mean by algorithmic complexity ? Explain Time complexity and space complexity in brief.
 - (b) What is Data structure? Write a brief note on classification of data structure. 2+5

2. (a) Define AVL tree. Construct AVL tree for following data :

1, 2, 3, 4, 8, 7, 6, 5, 11, 10, 12

- (b) Write two functions to implement two basic operations of stack.
- (c) Why is circular linked list needed over single linked list? 8+6+1
- 3. (a) Explain the BFS algorithm for graph traversal with an example.
 - (b) Show the every step of constructing binary search tree using the following list of nodes: 16, 7, 15, 20, 9, 2, 6.
 - (c) Write down the pre-order, post-order and in-order traversal order of nodes of the binary search tree obtained in the above questions. 6+5+4
- 4. (a) Write down a function to insert nodes in a BST.
 - (b) What is deque?
 - (c) What is linear probing in hashing?
 - (d) Write down the relative advantages and disadvantages of array and linked list. 5+2+3+5
- **5.** (a) Convert the following infix expression into equivalent postfix expression:

4\$2*3-3+8/4*(1+1)

- (b) Write an algorithm to implement merge sort.
- (c) What is a complete binary tree? What is its depth? Give an example.

C/22/BCA/2nd Sem/1202

- (d) Write an algorithm to traverse a binary search tree in pre-order fashion. 4+4+4+3
- 6. (a) Define stack. How is it different from Queue?
 - (b) What is Priority Queue?
 - (c) Write an algorithm to concatenate Number of nodes to a linked list, Where N is given by user. (2+3)+3+7
- 7. (a) What are the basic differences of graph over tree?
 - (b) Write down the algorithm to implement insertion sort.
 - (c) Why the time complexity of binary search is lower than liner search?
 - (d) Define the following terms :
 - (i) depth of a tree
 - (ii) Full binary tree. 2+6+4+3
- **8.** Write short notes on any three of the following : 3×5
 - (a) DFS
 - (b) Bi-connected graph
 - (c) Recursion
 - (d) Circular Linked list
 - (e) Euclid's algorithm.

C/22/BCA/2nd Sem/1202

Group – B

Answer any *one* question. 1×10

- **9.** (a) What do you mean by sparse matrix? What is collision in hashing? 2+2
 - (b) Write the difference between B tree and B^{++} tree. (2+2)+6
- 10. (a) Explain quicksort algorithm with a suitable example.

jionasaat -

(b) Differentiate between array of pointers and pointer to an array with proper example. 6+4

(Internal Assessment : 30)

C/22/BCA/2nd Sem/1202