NEW

2017

BCA

2nd Semester Examination

DATA STRUCTURE

PAPER—1202

Full Marks : 100

Time : 3 Hours

The figures in the margin indicate full marks.

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

Illustrate the answers wherever necessary.

Answer Q. No. *1* and any *four* from the rest.

1. Answer any *five* questions from the following : 5×2

(a) Name two sorting techniques that are recursive in nature.

(b) Name the data structures used by the two graph traversal algorithms : BFS and DFS.

(c) What do you mean by height-balance tree ?

(d) What do you understand by sparse matrix ?

(e) Write down the equivalent postfix expression of $[(a+b)*c]-d$.

(f) Name the tree traversal algorithms that traverses the root node at last and at the first.

(g) How do we detect if an ordinary queue is empty or not ?

(h) Give one example of linear data structure and one example of non-linear data structure.

2. (a) Implement typical stack operation when stacks are represented using (1) arrays and (2) using singly linked lists.

(b) Define binary search tree. Write an algorithm to implement insertion operation. (4+4)+7

3. (a) Write an algorithm to convert INFIX expression into POSTFIX expression.

   (b) Define AVL tree ? Construction AVL tree for following data : 7+8

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

4. (a) Give an algorithm to reverse the elements of a single linked lists without using a temporary list.

   (b) Write algorithm to insert and delete elements from a doubly linked list. 7+8

5. (a) Write down the merge sort algorithm.

   (b) What are the applications of hashing data structure ?

   (c) How does collision occur in hashing ? Mention one solution to over come collision in hashing.

   (d) Write an algorithm to insert a node as the last node of a linked list. 2+(2+2)+4

6. (a) Write down the relative advantages and disadvantages of array and linked list.

(b) Write an algorithm to calculate average of a set of integers stored in a singly linked list. Explain if there will be any improvement in time complexity of the algorithm if we use array to store the integers.

(c) Write an application where it is advantegious to use doubly linked list instead of singly linked list.

5+(6+2)+2

7. Write short notes on any *three* of the following : 3×5

(a) Shortest path problem.

(b) Complexity of an algorithm.

(c) Euclid's algorithm.

(d) B-Tree

[Internal Assessment — 30]