

2011

DATA STRUCTURE WITH C

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

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

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10
- i) Let q be the queue of integers defined as follows :
- ```
#define MAX10
struct queue {
 int data [MAX];
 int rear, front;
} q;
```
- To insert an element into the queue, we may write operation
- a) `++q.data[q.rear]=x;`
  - b) `q.data[q.rear]++=x;`
  - c) `q.data[++q.rear]=x;`
  - d) none of these.
- ii) The tree traversal technique in which the root is traversed after its children is known as
- a) post-order traversal
  - b) pre-order traversal
  - c) in-order traversal
  - d) none of these.



- xi) The sparse matrix is a matrix whose
- most of the elements are non-zero
  - half of the elements are zero and half of the elements are non-zero
  - most of the elements are zero
  - none of these.
- xii) The prefix notation is also known as
- reverse notation
  - reverse polish notation
  - polish notation
  - none of these.

### GROUP - B

#### ( Short Answer Type Questions )

Answer any *three* of the following 3 × 5 = 15

- What is Data structure ? What is ADT ? Explain with an example.
- What is circular queue ? How is it different from queue ? What advantage do we get from circular queue over ordinary queue ?
- Convert the following infix expression into postfix form by using stack :  

$$a + b * c - ( d - e * f ) / g$$
- What is Linked List ? What are its advantages over array ? What are its disadvantages over array ? 1 + 2 + 2
- Distinguish between DFS and BFS. Indicate their time complexities. 4 + 1

### GROUP - C

#### ( Long Answer Type Questions )

Answer any *three* of the following. 3 × 15 = 45

- What is binary search tree ? 2
  - Construct the binary search tree if the elements are in the order :  
60, 75, 25, 66, 50, 55, 45, 40, 35, 57, 30 4

- c) Delete the following nodes in order and show each step :
- i) Node with 55
  - ii) Node with 66
  - iii) Node with 50. 3 + 3 + 3
8. Write short notes on any *three* of the following : 3 × 5
- a) De-queue
  - b) Non-linear data structure
  - c) Hashing
  - d) Priority queue.
9. a) Define General tree. Write an algorithm to convert a General tree into a binary tree. 7
- b) Define *B*-tree. Construct a *B*-tree of order 5 from the following key values :
- a, g, f, b, k, d, h, m, j, e, s, i, r, x, c, l, n, t, u, p.*
- Also delete *h, r, p, d.* 8
10. Write the functions of the following :
- a) Insert a node after a particular node in a Single Linked List. 5
  - b) Reverse display of the list elements in a Doubly Linked List. 5
  - c) Physically reverse the Single Linked List. 5
11. a) Write a C function for selection sort. 6
- b) How does binary search give benefit over sequential search ? 3
- c) Explain the divide and conquer rule with example. 6

=====