22317

24225

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

(a) Define linear data structure and non-linear data structure.

(b) State the following terms :

(i) Searching

(ii) Sorting

(c) State any two applications of queue.

(d) Define directed and undirected graph.

(e) Give the classification of data structure.

(f) Draw the diagram of circular queue with front and rear pointers.

(g) Define :

(i) General Tree

(ii) Binary Tree

2. Attempt any THREE of the following : **12**

(a) Explain stack overflow and stack underflow with example.

(b) Describe the working of Bubble sort method with an example.

(c) Explain Binary Search Tree (BST) with example.

(d) Explain time and space algorithm complexity.

3. Attempt any THREE of the following : **12**

(a) Differentiate between stack and queue.

(b) Write a program to search a key in a singly linked list.

(c) Arrange the given numbers in ascending order using radix sort :

361, 12, 527, 143, 9, 768, 348

(d) Define the following terms :

(i) Root

(ii) Node

(iii) Leaf Node

(iv) Degree of Node

4. Attempt any THREE of the following : **12**

(a) Construct the Binary Search Tree for the following elements :

35, 11, 15, 26, 33, 78, 99, 56, 45, 82

(b) Describe the working of Insertion sort with example.

(c) Write a procedure for inserting and deleting an element from queue.

(d) Give the adjacency list and matrix for following graph.

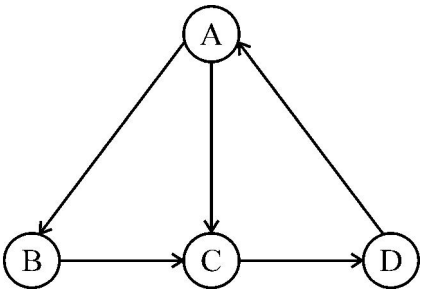

Fig.

(e) Describe the concept of linked list with the terminologies :

Node, Next pointer, Null pointer, Empty list

5. Attempt any TWO of the following : **12**

(a) Sort the following in descending order using quick sort :

A = {3, 12, 5, 19, 1, 17}

(b) Write an algorithm to insert an element at the beginning and at the end of linked list.

(c) Define the term recursion. Write a 'C' program to display factorial of a number using recursion.

6. Attempt any TWO of the following : **12**

(a) Draw tree for given expression

$(a - 2b + 5c)^2 * (4d - 6e)^5$

(b) Convert the given infix expression to postfix expression using stack and also show the details of stack at each step of conversion.

$(a * b + c/d) * (e + f \uparrow g)$

(c) Write a program to insert given item in linear linked list.
