22317

12223

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 complexity and classify it.

(b) State the following terms :

(i) searching

(ii) sorting

(c) List any four applications of stack.

(d) List any four types of queue.

(e) Define Abstract data type.

(f) Define the following terms :

(i) Sibling

(ii) Depth of tree

(g) Write algorithm for preorder traversal of binary tree.

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

(a) Write a program to implement bubble sort.

(b) Convert following expression into postfix form with illustration of all steps using stack :

(A + B – C + D*E/F^G)

(c) Differentiate between Stack and Queue (any **four** points).

(d) Explain node structure for single linked list. Also write advantages of singly list over array. (any **Two**)

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

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

(b) With a neat sketch explain working of priority queue.

(c) Find location of element 20 by using binary search algorithm in the list given below :

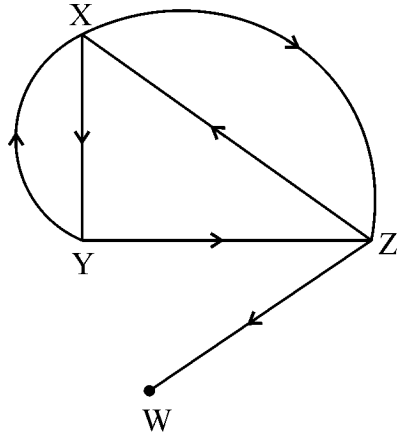
10, 20, 30, 40, 50, 60, 70, 80

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

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

(a) Differentiate between linear and non-linear data structure. (any **four** points)

(b) Consider the graph given below :



(i) Find indegree(x)

(ii) Find outdegree(z)

(iii) Find sink node

(iv) Successor of node y

(c) Describe working of linear search with example.

(d) Compare linear list with circular list.

(e) Write an algorithm to insert a new node at the beginning in linear list.

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

(a) Draw tree for given expression :

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

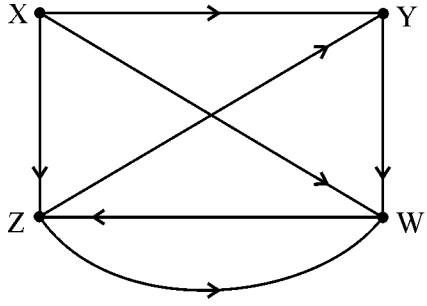
(b) Write a 'C' program for insert and delete operation to be performed on queue.

(c) Write a 'C' program for insertion sort. Sort the following array using insertion sort :

30 10 40 50 20 45

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

(a) Consider the graph G given below :



(i) Write Adjacency matrix representation.

(ii) Write Adjacency list.

(b) Write a menu driven 'C' program to implement stack using array with the following menu :

(i) push

(ii) pop

(iii) display

(iv) exit

(c) Write the 'C' function for :

(i) searching a node in single linked list.

(ii) counting number of nodes in single linked list.