22317

12526

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

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

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

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) 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) State the following operations on data structure.

i) Insert

ii) Delete

b) Define :

i) Binary Tree

ii) Binary Search Tree

c) Define queue. List their operations.

d) Differentiate between linear and nonlinear data structures. (Two points)

e) Define the terms of graph and give example

i) In-degree

ii) Out-degree

f) Write an algorithm to PUSH element into the stack.

g) List any four method of sorting.

P.T.O.

Marks

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

a) Write 'C' program for insertion of an element into an array.

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

c) Explain circular queue with their operations.

d) Describe circular linked list with suitable diagram. Also state advantage of circular linked list over linear linked list.

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

a) Show the effect of PUSH and POP operations on the stack of size 8.

i) PUSH (40)

ii) PUSH (30)

iii) POP

iv) PUSH (60)

b) Sort the following numbers in ascending order using insertion sort

Given Numbers : 25, 15, 30, 9, 99, 20, 26

c) Write an algorithm to count number of nodes in singly linked list.

d) Convert the following expression into post fix form.
Give stepwise procedure.
(A + B – D) / (E – F) + G

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

a) Find the location of element 29 by using Binary search algorithm in the list given below.
11, 5, 21, 3, 29, 17, 2, 45

b) Construct a binary search tree for following elements and write postorder traversal of tree.
10, 5, 8, 9, 7, 6, 2, 15

c) Compare linked list and Array. (Four points)

Marks

d) Draw expression tree for the following
$(6a^3 - 4b^2)^3 \ (4c^2 + 7b^2 + 9c)^4$

e) Write a program to implement bubble sort.

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

a) Consider the graph G given below –

i) Write Adjacency matrix representation

ii) Write Adjacency list

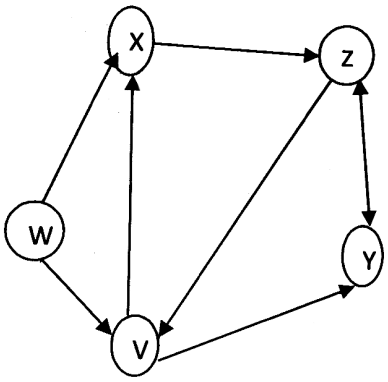

Fig. No. 1

b) Write the 'C' function for single linked list

i) Insertion at beginning

ii) Searching a node

c) Evaluate the following postfix expression
8, 2, *, 12, 3, / +, 10, 4, +, +
Show diagrammatically each step of evaluation using stack.

Marks

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

a) For given binary tree write in-order pre-order and post-order traversal.

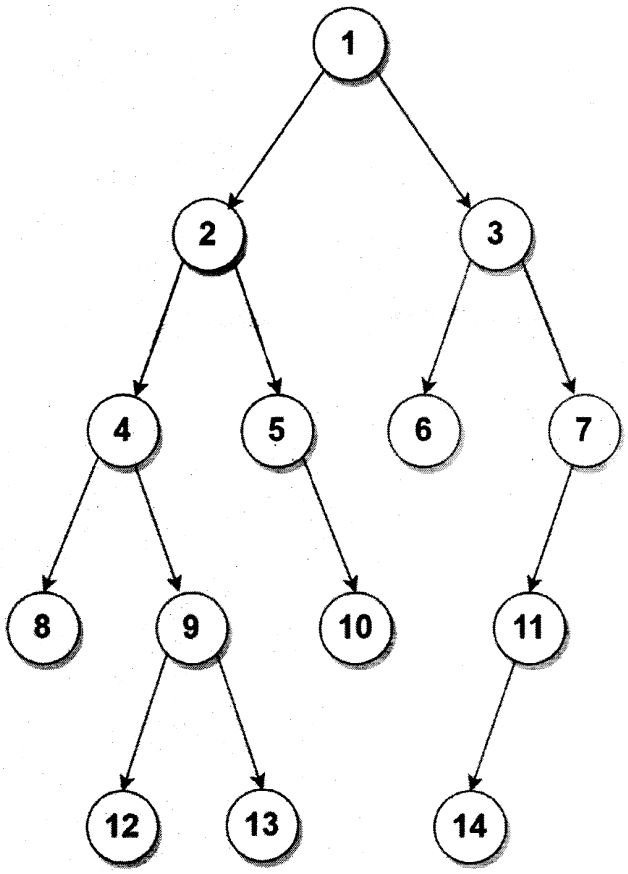

Fig. No. 2

b) Create singly linked list using data fields 65, 55, 45, 25, 90 search a node 25 from the singly linked list and show stepwise procedure step-by-step with the help of diagram from start to end.

c) Write a menu driven 'C' program to implement queue using array with the following menu.

i) Insert

ii) Delete

iii) Display

iv) Exit