313301

12425

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

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

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

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

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(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) Write any four operations performed on data structure.

b) List any two applications of stack.

c) List any four sorting techniques.

d) Differentiate between stack and queue. (Min. two points each)

e) State the following terms:

i) Leaf node of a tree

ii) Degree of a tree

f) State the syntax of declaration of doubly linked list.

g) Define the term general tree and binary tree.

Marks

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

a) Describe Bubble sort. State its advantage and disadvantages.

b) Describe the concept of linked list with the terminologies: node, next pointer null pointer sand empty list.

c) Explain types of queue and implement a program for circular queue.

d) Draw tree structure for the following expression.

(3A + 7B) – [(6D – 4E) ^ 6C]

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

a) Write 'C' program to implement a linear queue with insert and delete operation.

b) Convert following expression into post fix form. Give stepwise procedure.

A * (B + C) / D – G

c) Differentiate between linear data structure and non-linear data structure. (Min. four points each.)

d) List any four applications of linked list.

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

a) Find the position of element 65 using binary search method in an Array 'A'.

Given below : Show each step.

A = {23, 12, 5, 29, 10, 65, 55, 70} Write complete procedure.

b) Construct a binary search tree for following elements:

10, 3, 15, 22, 6, 45, 65, 23, 78, 34, 5 show each step of construction of BSP.

c) Construct a singly linked list using data field : 22, 27, 86, 48, 75 and show procedure step-by-step with the help of diagram start to end.

Marks

d) Show the effect of PUSH and POP operation on to the stack of size 10. The stack contains 10, 20, 30, 40, 50 and 60 with 60 being at top of the stack.

Show diagrammatically the effect of –

i) PUSH 55

ii) PUSH 70

iii) POP

iv) POP

Sketch the final structure of stack after performing the above said operations.

e) Draw structure to following:

i) Singly linked list

ii) Doubly linked list

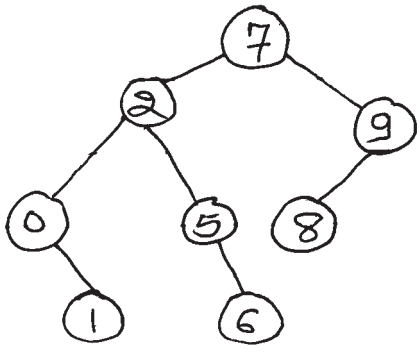
iii) Circular singly linked list

iv) Circular doubly linked list.

5. Attempt any <u>TWO</u> of the following: **12**

a) Convert following infix expression into prefix using stack in tabular form : (A + B) * C^D – (E/F).

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



<u>Fig. No. 1</u>

c) Distinguish between singly linked list and doubly linked list. (Minimum six points each)

Marks

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

a) Sort the following numbers in ascending order using selection sort.

{35, 14, 5, 102, 61, 10} and write the output after each iteration.

b) Define the term recursion. Write a program in C to perform multiplication of two numbers using recursion.

c) Describe queue implementation using linked list.
