313301

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 answer with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

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

(7) 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 Abstract Data Type (ADT).

b) State any two differences between linear and binary search.

c) Differentiate between Static and Dynamic Memory location. (Minimum two points)

d) Write any two operations performed on the stack.

e) List any four applications of queue.

f) Define the following terms with respect to tree :–

i) Sibling

ii) Depth of tree.

g) Write algorithm for preorder traversal of binary tree.

P.T.O.

Marks

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

a) Describe working of Bubble sort with example.

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

c) With a neat sketch explain working of priority queue.

d) Draw tree for given expressions :–

$(a - 5b)^2 * (3x - 7y)^3$.

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

a) Explain linear and non-linear data structures.

b) Explain different operations on singly linked list.

c) Explain Heap with example.

d) Show the effect of INSERT and DELETE operations on linear queue of size 10. The linear queue sequentially contains 10, 20, 30, 40 and 50 where 10 is at front of queue. Show diagrammatically the effect of :–

i) INSERT(30)

ii) DELETE

iii) INSERT(45)

iv) INSERT(60)

Marks

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

a) Find the position of element 29 using binary search method in an array given as :–

{12, 5, 8, 16, 29, 17, 2, 43}

b) Describe the concept of linked list with terms :–

Head, Node, Next, Pointer and Null pointer.

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

d) Explain stack overflow and stack underflow with example.

e) From the given tree, find following in Figure No. 1.

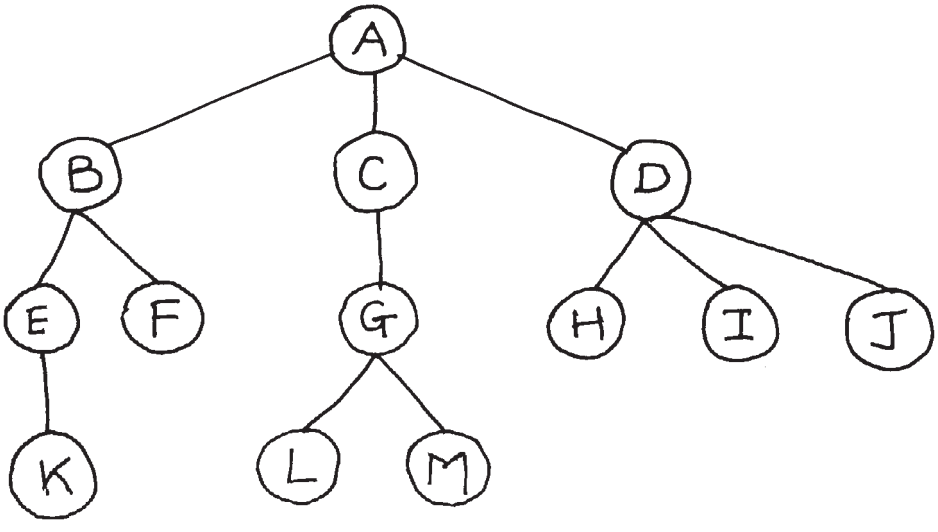

Fig. No. 1

i) Level of node M

ii) In-degree of node E

iii) Out-degree of node D

iv) Height of tree.

Marks

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

a) Create a singly linked list using data fields :– 15, 30, 90, 60, 75. Search a node 60 from singly linked list and show procedure step-by-step with the help of dia. start to end.

b) Convert the following Infix expression to its Postfix form using stack. Show the details of stack at each step of conversion.

Expression : [(A + B) – C* (D/E)] + F.

c) Construct the Binary Search Tree (BST) of following :– 35, 90, 45, 60, 25, 35, 10, 20, 75, 95 and traverse the above BST in Inorder, Preorder and Postorder.

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

a) Sort the following numbers in ascending order using insertion sort :–

{25, 15, 4, 103, 62, 9} and write the output after each iteration.

b) Evaluate the following postfix expression :–

10, 2, *, 15, 3, 1, +, 12, 3, +, +.

Show diagrammatically each step of evaluation using stack.

c) Write a 'C' function for Insert and Delete operation to be performed on queue.

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