2012

Time: 3 hours

Full Marks: 80

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

(Objective Type Questions)

Answer all questions : 2×10 = 20

1. Choose the correct answer of the following :

(a) Which among the following pairs of operations is supported by an array ADT ?

(i) Store and retrieve
(ii) Insert and delete
(iii) Copy and delete
(iv) Append and copy

CX – 9/3
(b) The prefix expression for the infix expression $g*(h + i) / y-z$ is:

(i) $\div + ghiyz$

(ii) $\div + g + h i y z$

(iii) $\div + g + h i - y z$

(iv) None of the above

(c) Which among the following properties does not hold well in a stack?

(i) A stack supports the principle of Last In First Out

(ii) A push operation decrements the top pointer

(iii) A pop operation deletes an item from the stack

(iv) A linear stack has limited capacity

(d) A collection of data and links is ________.

(i) List

(ii) Node

(iii) Tree

(iv) Queue
(e) The maximum number of nodes in a binary tree of depth k is:
   (i) \(2^{k-1}\)
   (ii) \(2^{(k-1)} - 1\)
   (iii) \(2^{2k-1}\)
   (iv) \(2^{(k-1)-1}\)

(f) Hash function has a property to:
   (i) Minimizes number of collisions
   (ii) Minimizes the rate of overflow
   (iii) Preserves the order of key values
   (iv) None of the above

(g) The search keys must be ordered in:
   (i) Hashing
   (ii) Binary Search
   (iii) Sequential Search
   (iv) None of the above

(h) A graph having depth first traversal produces:
   (i) A spanning forest of the graph
(ii) A minimal spanning tree
(iii) A spanning tree of the graph
(iv) None of the above

(i) The equivalent post fix expression for the infix expression $a + b + c$ is:
(i) $abc++$
(ii) $ab+c+$
(iii) $ab++c$
(iv) $a++bc$

(i) Which among the following norms is not satisfied by a binary search tree $T$?
(i) All keys of the binary search tree need not be distinct
(ii) All keys in the left sub tree of $T$ are less than the root element
(iii) All keys in the right sub tree of $T$ are greater than the root element
(iv) The left and right sub trees of $T$ are also binary search trees

CX – 9/3 (4) Contd.
Group – B
(Long-answer Type Questions)

Answer any four questions: \[ 15 \times 4 = 60 \]

2. Distinguish between the row major and column major ordering of an array.

3. Explain binary tree with suitable example. List the properties of a binary tree.

4. How are insert operations carried out in a stack? What are the demerits of a linear stack?

5. Explain circular linked list with suitable example. Give also the algorithm.

6. Write a C program to input a binary tree implemented as a linked representation.

7. Explain hashing. What are the different methods of obtaining hash functions?

8. Explain DFS and BFS with suitable examples.

9. What is the need for an AVL tree? How is the rotation free deletion of a node having both the sub trees, done in an AVL search tree?

CX – 9/3 (800) (5) BCA(II) / 11 / 12