

2014

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 : $2 \times 10 = 20$

1. Choose the correct answer of the following :

(a) A collection of data and links is _____.

(i) Tree

(ii) Queue

(iii) List

(iv) Node

(b) The maximum number of nodes in a binary tree of depth k is :

(i) 2^{k-1}

(ii) 2^{2k-1}

(iii) $2^{(k-1)-1}$

(iv) $2^{(k-1)} - 1$

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

(i) Store and retrieve

(ii) Insert and delete

(iii) Append and copy

(iv) Copy and delete

(d) Hash function has a property to :

(i) Minimizes number of collisions

(ii) Preserves the order of key values

(iii) Minimizes the rate of overflow

(iv) None of the above

(e) The search keys must be ordered in :

(i) Binary Search

(ii) Sequential Search

(iii) Hashing

(iv) None of the above

(f) A graph having depth first traversal produces:

(i) A spanning tree of the graph

(ii) A spanning forest of the graph

(iii) A minimal spanning tree

(iv) None of the above

(g) The prefix expression for the infix expression

$a*(h+i) / x - y$ is :

(i) $-/* + ahixy$

(ii) $-/* + a+hixy$

(iii) $/* + a+hi-xy$

(iv) None of the above

(h) 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 linear stack has limited capacity

Group – B

(Long-answer Type Questions)

Answer any four questions of the following :

15×4 = 60

2. Explain circular linked list with suitable example.
Give also the algorithm.
3. Create a binary search tree when the elements arrive in the following order :
15, 5, 20, 7, 29, 11, 23, 29, 13, 12
4. Distinguish between the row major and column major ordering of an array.
5. Explain binary tree with suitable example with in-order, pre-order and post-order traversal. List the properties of a binary tree.
6. How are insert operations carried out in a queue ?

NR – 24/4

(5)

(Turn over)

(iii) A push operation decrements the top pointer

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

(i) The equivalent post fix expression for the infix expression $x + b + y$ is :

(i) $xby++$

(ii) $x++by$

(iii) $xb+y+$

(iv) $xb++y$

(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

NR -- 24/4

(4)

Contd.

7. Explain hashing. What are the different methods of obtaining hash functions ?
8. Explain Dijkstra's Algorithm with suitable examples.
9. What is AVL tree ? Compare it with Binary tree.

