

2018

Time : 3Hrs *Full Marks : 80*

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

The questions are of equal value.

Answer any five questions in which Q. No. 1 is compulsory.

1. Choose the correct answer of any eight of the following questions:

   (i) The base case for a recursive definition of the factorial of n is

   (a) Factorial (-1)

   (b) Factorial (0)

   (c) Factorial (1)

   (d) Factorial (n-1)

   (ii) The minimum number of fields with each node of doubly linked list is

   (a) 1

   (b) 2

   (c) 3

   (d) 4

(iii) Stack is

(a) A linear data structure

(b) A non-linear data structure

(c) Both (a) & (b)

(d) None of the above

(iv) The postfix expression for the infix expression A+B*(C+D)/F+D*E is

(a) AB+CD+*F/D+E*

(b) ABCD+*F/+DE*+

(c) A*B+CD/F*DE++

(d) None of the above

(v) A data structure in which insertion and deletion can take place at both the ends is called

(a) Dequeue

(b) Stack

(c) Circular queue

(d) None of the above

(vi) The traversal of a binary tree is

(a) 0(n)

(b) 0(1)

(c) $0(n^2)$

(d) $0(\log_{2n})$

(vii) A vertex with degree one in a graph is called

(a) A leaf

(b) Pendant vertex

(c) Adjacency list

(d) None of the above

(viii) A binary search is used to search data in

(a) Sorted list

(b) Unsorted list

(c) Both (a) & (b)

(d) None of the above

(ix) Which of the following structure is useful in implementing Heap Sort?

(a) Stack

(b) Linked list

(c) Array

(d) Queue

2. What is Stack? List the operations that can be performed on a stack. What are the various applications of a stack structure?

3. What is Recursion? What are the different types of Recursion What is the need of stack in implementing a Recursive function?

4. What are doubly linked list? Write a function in C to create a double linked list of *n* nodes.
5. Define the term Queue and De-queue? Write an algorithm to implement Queue by using linked list.
6. What do you mean by Tree? Explain with example. Draw a binary tree with seven vertices and as many leaves as possible.
7. What are the different types of Sorting? Write an algorithm for Heap Sort. Find the time complexity of the above algorithm.
8. What do you mean by Linear search and Binary search? Explain with example. List the advantages of Binary search over Linear search.
9. What is Graph? Compare graph with tree. When does a graph become a tree?

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