

Time : 3 Hours

Marks : 80

Instructions :

1. All Questions are Compulsory.
2. Each Sub-question carry 5 marks.
3. Each Sub-question should be answered between 75 to 100 words. Write every questions answer on separate page.
4. Question paper of 80 Marks, it will be converted in to your programme structure marks.

1. Solve any **four** sub-questions.
 - a) What is a non-primitive data structure? Give an example. 5
 - b) Explain five important properties of a good algorithm and its analysis. 5
 - c) Write a note on '*Space complexity*' with an example. 5
 - d) Explain in brief '*Insertion sort*', write five points. 5
 - e) Explain the '*Binary Search*' with example and state its advantages two points. 5
2. Solve any **four** sub-questions.
 - a) Write a five point note on '*Polish notation*'. 5
 - b) List the applications of Queue. Explain Double Ended Queue. 5
 - c) Explain '*Linked list*' with its advantages and disadvantages. 5
 - d) Explain '*Circular linked list*'. Enlist related operations on it. 5
 - e) Explain in brief following term for Tree data structure. 5
 - i) Directed Edge
 - ii) Ancestor and descendant node
3. Solve any **four** sub-questions.
 - a) Explain in brief an '*Expression Tree*' with an example. 5
 - b) Explain representing list as '*Binary tree*'. Write algorithm for finding K^{th} element and deleting an element. 5
 - c) What is Tree traversing? Explain In-Order traversing of a tree. 5
 - d) Draw a diagram and write three differences between '*Tree*' and '*Graph*' data structure. 5
 - e) What is '*Breadth First Search*'? 5

4. Solve any **four** sub-questions.
- a) Explain any one hashing technique in brief : Division or Mind square. 5
 - b) Write an algorithm or C++ program function that uses a selection sort algorithm on the one dimension array to be sorted. 5
 - c) Write function code C++ and declaration for two operations of stack in C++ 5
 - i) PUSH
 - ii) POP
 - d) Write an algorithm or C++ code for a queue any one operation like : display, add Q, delete Q. Add proper declaration and functions. 5
 - e) Give example in C++ code and explain the concept of Recursion. 5

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