



Time Allotted : 3 Hours

Full Marks : 70

The Figures in the margin indicate full marks.  
 Candidate are required to give their answers in their own words as far as practicable.

## Group-A (Very Short Answer Type Question)

1. Answer any ten of the following

(1 x 10 = 10)

- How many nodes are there in a full state space tree with  $n = 6$ ?
- What is the type of the algorithm used in solving the 8 Queens problem?
- What do you call the selected keys in the quick sort method?
- Which matrix does have high proportions of zero entries as the elements?
- In Algorithm Specification the blocks are indicated with matching \_\_\_\_\_
- The output of Kruskal and Prims algorithm is \_\_\_\_\_

(VII) Find Output:

```
main()
{
  int x=7,y=5;
  x=y++ + x++;
  y=++y + ++x;
  printf("\n %d %d ",x,y);
}
```

(VIII) In an arbitrary tree (not a search tree) of order M, its size is N, and its height is K. What is the computation time needed to find a data item on T?

(IX) For the expression  $((A + B) * C - (D - E)^{(F + G)})$ , the equivalent Postfix notation is

(X) Find the Time complexity of the algorithm:

Algorithm Display(A)

```
{
  S:=0.0;
  For(i=0;i<n;i++)
  {
    S:=S+A[i];
  }
  Return S;
}
```

(XI) The tightest lower bound on the number of comparisons, in the worst case, for comparison-based sorting is of the order of \_\_\_\_\_

(XII) A \_\_\_\_\_ is a round trip path along n edges of G that visits every vertex once and returns to its starting position.

## Group-B (Short Answer Type Question)

Answer any three of the following

(5 x 3 = 15)

- What are Sequential Algorithms?
- Explain Binary Search.
- Explain principle of Optimality
- 5. Discuss about Transitive closure
- 6. Explain Dijkstra algorithm

(5)

(5)

(5)

(5)

(5)

## Group-C (Long Answer Type Question)

Answer any three of the following

(15 x 3 = 45)

7. (a) Prove that  $\lceil \ln(n+1) \rceil \in O(n^2)$  [6]
- ~~(b) What is the use of Asymptotic Notations?~~ [8]
- (a) Prove that  $100n+5 \in O(n^2)$  [8]
- (b) Explain order of growth. [7]
- ~~(c) Define Feasible Solution~~ [8]
- ~~(d) Define Optimal solution~~ [7]
- ~~(e) Explain n-Queens problem. How you can solve it?~~ [8]
- ~~(f) Explain Subset-Sum Problem.~~ [7]
11. Compare and contrast tractable and intractable problems. [15]

\*\*\* END OF PAPER \*\*\*

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