



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 ]

- (I) How many nodes are there in a full state space tree with  $n = 6$ ?
- (II) What is the type of the algorithm used in solving the 8 Queens problem?
- (III) What do you call the selected keys in the quick sort method?
- (IV) Which matrix does have high proportions of zero entries as the elements?
- (V) In Algorithm Specification the blocks are indicated with matching \_\_\_\_\_
- (VI) 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 ]

1. What are Sequential Algorithms? [ 5 ]
2. Explain Binary Search. [ 5 ]
3. Explain principle of Optimality [ 5 ]
4. Discuss about Transitive closure [ 5 ]
5. Explain Dijkstra algorithm [ 5 ]

**Group-C (Long Answer Type Question)**

Answer any three of the following

[ 15 x 3 = 45 ]

7	(a) Prove that $(\frac{1}{2}n(n-1)) \in O(n^2)$	
	What is the use of Asymptotic Notations?	[9]
	(a) Prove that $100n+5 \in O(n^2)$	[8]
	(b) Explain order of growth.	[7]
5	Define Feasible Solution	[8]
	Define Optimal solution	[7]
	Explain n-Queens problem. How you can solve it?	[8]
	Explain Subset-Sum Problem.	[7]
11.	Compare and contrast tractable and intractable problems.	[15]

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

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