 End Sem (III) – MCA (XIV)

2016

Time : 3 hours

Full Marks: 70

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 **all** the Groups are directed.

Group – A

(Compulsory)

1. Answer **all** questions of the following: 1x15=15
   a. The order of Linear Search in worst case is O (n/2). (True/False)
   b. Linear Search is more efficient than Binary Search. (True/False)
   c. The complexity of all pairs shortest paths algorithm is
      i. O (n log n)
      ii. $O(N^3)$
      iii. O(N)
      iv. None of these
   d. A graph with no cycle is called _____ graph.
   e. The complexity of Bubble Sort is:
      i. n log n

ii. N
iii. $O(N^2)$
iv. None of these

f. Quick sort algorithm uses the programming technique of _____

g. The Asymptotic complexity of algorithm depends on hardware and other factors. (True / False)

h. The set of algorithms whose order is O(1) would run in the same time. (True / False)

i. If a tree has 45 edges, how many vertices does it have?
   i. 45
   ii. 40
   iii. 46
   iv. None of these

j. Running time of Kruskal's algorithm is:
   i. O (E log E)
   ii. O (E log V)
   iii. N log n
   iv. None of these

k. For Binary Search, the array has to be sorted in ascending order only. (True / False)

l. Kruskal's algorithm is an example of greedy algorithm (True / False)

m. _____ has zero degree.

n. A graph G can have many different spanning tree. (True / False)

o. The term optimal mean:
   i. Shortest

ii. Cheapest
iii. Fastest
iv. None of these

Group – B

Answer any **five** questions of the following: 4x5=20

2. What is Complexity? What is Asymptotic Analysis?
3. What is Algorithm? Explain all the characteristics of a good algorithm.
4. Define Prims Algorithm for minimum spanning tree. Explain it with example.
5. Give an example in which Greedy Technique fails to deliver an optimal solution.
6. What is a Non-deterministic Algorithm? Explain with the help of an example.
7. Write a Recursive Algorithm to reverse a string entered.
8. Explain the solution of Travelling Salesman Problem via back-tracking.

Group – C

Answer any **five** questions of the following: 7x5=35

9. What is Dynamic Programming? Why is it called dynamic programming?
10. What is Recursion? What are the conditions for recursive function to run?
11. Explain NP hard and NP complete problems with the help of suitable example.
12. Why space complexity is more critical than time complexity?

13. Explain the significance of omega, big O and theta notations.
14. Explain Divide and Conquer techniques? What are the disadvantages of using divide and conquer?
15. Write short notes on the following:
    a. Knapsack problem
    b. n-queen problem
    c. Hamiltonian cycle

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