Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

[Total No. of Questions: 09] [Total No. of Pages: 02]

Uni. Roll No. .....

Program/ Course: B.Tech. (Sem 5th)
Name of Subject: Design and Analysis of Algorithms EVENING
Subject Code: CS-14503
Paper ID: 15458 24 MAY 2019

Time Allowed: 3 Hours **Max. Marks: 60**

NOTE:

1) **Section-A** is **compulsory** EVENING
2) Attempt any **four** questions from **Section-B** and any **two** questions from **Section-C** 24 MAY 2019
3) Any missing data may be assumed appropriately

Section – A **[Marks: 02 each]**

Q1.

a) What are NP-complete problems? Give examples.
b) What are the time complexities of pre-processing stage and matching stage of Knuth Morris-Pratt string matching algorithm?
c) What do you mean by time complexity and space complexity of an algorithm?
d) What are the advantages of Merge sort over the quick sort algorithm?
e) What is the difference between Dijkstra and Bellman Ford algorithms for solving single source shortest path problems?
f) What are the conditions that must be satisfied to solve a problem using Dynamic Programming?
g) List any 4 problems that can be solved using Backtracking.
h) What is the significance of the lower bound of an algorithm?
i) How is the accuracy of approximation algorithm measured?
j) State the applications of graph coloring method.

Section – B **[Marks: 05 each]**

Q2. Consider 5 items along with their respective weights and values.
I = <i1, i2, i3, i4, i5>
w = <5, 10, 20, 30, 40>
v = <30, 20, 100, 90, 160>
The capacity of the knapsack W = 60. Find the solution for the fractional knapsack problem.

Q3. What is the relationship among P, NP and NP complete problems? Show with the help of a diagram.

Q4. Explain Robin Karp algorithm for string matching with example. State why is it better than naïve algorithm?

Q5. What are asymptotic notations? Describe with the help of examples various commonly used asymptotic notations.

Q6. Explain Subset Sum problem using backtracking with example.

Section – C [Marks: 10 each (05 for each sub-part, if any)]

Q7. Explain the algorithm of quick sort. Compute the time complexity of quick sort. Also sort the list 10, 80, 30, 90, 40, 50, 70 using quick sort.

Q8. Define spanning tree. Write Kruskal's algorithm for finding minimum cost spanning tree. Describe how Kruskal's algorithm is different from Prim's algorithm for finding minimum cost spanning tree with the help of an example.

Q9. Solve 8 Queens' problem using backtracking. Also write it's algorithm

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