Code No: 114CS **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, December - 2017
DESIGN AND ANALYSIS OF ALGORITHMS
(Computer Science and Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Write about Divide and conquer general method. [2]
b) Define any three asymptotic notations. [3]
c) List the applications of Greed method. [2]
d) Give an example for single source shortest Path problem. [3]
e) Give the general method for Dynamic programming. [2]
f) Explain about line and dead node. [3]
g) Explain the variable method in sum of subsets. [2]
h) State the Graph coloring problem with an example. [3]
i) Give an example for NP-Hard Problem. [2]
j) Differentiate Deterministic algorithms and non-deterministic algorithms. [3]

PART-B

(50 Marks)

2.a) Define Space Complexity. Compute space complexity for an algorithm to find factorial of a given number.
b) Illustrate the methods to find the connected components in a graph. [5+5]

OR

3.a) Explain how divide and conquer method is used to implement Merge sort technique with its Time complexity.
b) Write an algorithm for Quick sort. [5+5]

4.a) Write Kruskal's Algorithm.
b) Generate the MCST for the graph given in Figure 1 by applying Kruskal's algorithm. [5+5]

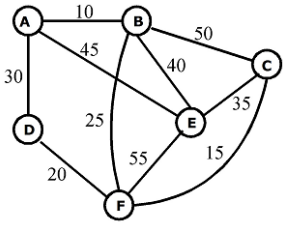

Figure: 1

OR

5.a) Discuss the Job sequencing with deadlines problem.
b) Illustrate 0/1 Knapsack problem with Greed approach. [5+5]

6.a) Explain Multi stage graph problem.
b) Explain the reliability design problem. [5+5]

OR

7.a) Explain all pairs shortest path problem with the graph given in figure 2.

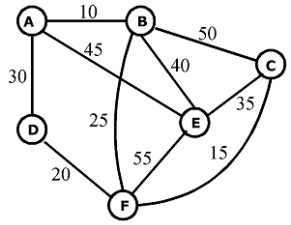

Figure: 2

b) Write an algorithm of Optimal Binary Search Trees. [5+5]

8.a) Explain 4-Queen's problem.
b) Discuss LC branch and bound solution for 0/1 Knapsack problem. [5+5]

OR

9.a) Illustrate the Hamilton cycles problem with backtracking method.
b) Explain travelling sales person problem applying Branch and bound method. [5+5]

10.a) What is NP-Complete class? Give any two examples.
b) Briefly explain Cooks-theorem. [5+5]

OR

11.a) Compare NP-Hard and NP-Complete classes.
b) Give any two examples for non-deterministic algorithms. [5+5]

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