Code No: 156AN **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, February - 2023
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE, ITE)

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

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What is an algorithm?	[2]
b)	Explain about big-oh notation.	[3]
c)	Define static space tree.	[2]
d)	Write and explain general iterative backtracking method.	[3]
e)	What is the time complexity of all pairs shortest path?	[2]
f)	Explain about OBST.	[3]
g)	What is Greedy method?	[2]
h)	Distinguish between Prim's and Kruskal's algorithms.	[3]
i)	Define branch and bound technique.	[2]
j)	Explain about non-deterministic algorithms.	[3]

PART – B

(50 Marks)

2.a) Write and explain the general method of divide-and-conquer strategy.
b) Derive the time complexity of Strassen's matrix multiplication. [5+5]

OR

3.a) Write and explain recursive algorithm of binary search method.
b) What is space complexity? Explain with suitable examples. [5+5]

4.a) Describe recursive formulation of backtracking technique.
b) How to implement disjoint sets? Explain. [5+5]

OR

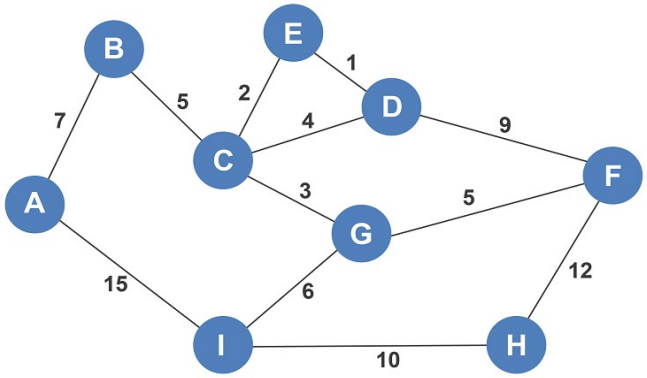
5.a) Explain about 4-queens problem with backtrack solution.
b) Discuss about number of connected components of a graph using disjoint set union. [5+5]

6. Use the function OBST to compute w(i, j), r(i, j), and c(i, j), $0 \le i < j \le 4$, for the identifier set (a1, a2, a3, a4) = (do, if, int, while) with p(1:4) = (3, 3, 1, 1) and q(0:4) = (2, 3, 1, 1, 1). Using the r(i, j)'s construct the optimal binary search tree. [10]

OR

7. Discuss about all pairs shortest problem using dynamic programming. [10]

8. Compute a minimum cost spanning tree for the graph shown below using
a) Prim's algorithm and
b) Kruskal's algorithm. [5+5]



OR

9. Explain about single source shortest path problem in Greedy method. [10]

10. Describe LC branch and bound solution of 0/1 Knapsack problem in detail. [10]

OR

11. Explain the following:
a) Nondeterministic knapsack algorithm
b) FIFO branch and bound. [5+5]

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