R18

Code No: 155EV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January/February - 2023

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CESE, CSE(CS), CSE(AIML), CSE(DS), CSE(N))

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)	Explain amortized complexity.	[2]
b)	How can we measure an algorithm's running time?	[3]
c)	What is AND/OR graph?	[2]
d)	State graph coloring problem.	[3]
e)	Write any two characteristics of a Greedy Algorithm.	[2]
f)	What is the importance of knapsack algorithm in our daily life?	[3]
g)	What is Hamiltonian cycle?	[2]
h)	Define spanning tree.	[3]
i)	What is meant by non-deterministic algorithm?	[2]
j)	What is NP-hard problem?	[3]

PART – B

(50 Marks)

2.a)	Sort the records with the following index values in the ascending order using quick sort algorithm. 2, 3, 8, 5, 4, 7, 6, 9, 1	[5+5]
b)	What is probabilistic analysis? Give example.	
	OR	
3.a)	Give the general plan of divide and conquer algorithms.	[5+5]
b)	What are the different mathematical notations used for algorithm analysis.	
4.	Given a set of non-negative integers {10, 7, 5, 18, 12, 20, 15}, and a value sum 35. Explain sum of subsets problem illustrating the above example.	[10]
	OR	
5.a)	What is weighting rule for Union(i, j)? How it improves the performance of union operation?	
b)	Give brief note on graph coloring.	[5+5]

6.a) Discuss about all pairs shortest path problem with suitable example.

b) Discuss briefly about the minimum cost spanning tree. [5+5]

OR

7. State the Job – Sequencing with deadlines problem. Find an optimal sequence to the n = 5 Jobs where profits (P1, P2, P3, P4, P5) = (20, 15, 10, 5, 1) and deadlines (d1, d2, d3, d4, d5) =(2, 2, 1, 3, 3). [10]

8. Draw the portion of the state space tree generated by LCBB for the knapsack instances: n=5, (P1, P2,… , P5) = (12,10,5,9,3), (w1, w2, ...,w5)=(3, 5, 2, 5, 3) and M =12. [10]

OR

9. Explain how Matrix – chain Multiplication problem can be solved using dynamic programming with suitable example. [10]

10. Solve the Travelling Salesman problem using branch and bound algorithms. [10]

OR

11.a) Discuss about cook's theorem.

b) What is the satisfiability problem? Explain. [5+5]

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