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18CS406/18IT406

II/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION

August, 2021

Fourth Semester

Time: Three Hours

Common to CSE and IT

Design and Analysis of Algorithms

Maximum: 50 Marks

Answer Question No. 1 Compulsorily. (10X1 = 10 Marks)

Answer ANY ONE question from each Unit. (4X10=40 Marks)

1.	a)	What is time complexity of an algorithm?	CO1	
	b)	Define algorithm.	CO1	
	c)	State single source shortest path problem.	CO2	
	d)	What are the advantages of greedy approach?	CO2	
	e)	When does worst case occurs for quick sort?	CO2	
	f)	What is principle of optimality?	CO3	
	g)	List the merits and demerits of BFS.	CO3	
	h)	What is a multi-stage graph?	CO3	
	i)	What is the state-space tree?	CO4	
	j)	Define NP- hard problem.	CO4	

Unit - I

2.	a)	What is asymptotic notation? Elaborate on Asymptotic Notations with examples.	CO1	5M
	b)	Analyze the time complexity for the sum of n array elements.	CO1	5M

(OR)

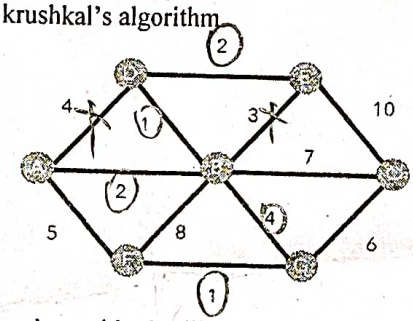
3.	a)	Write in detail about pseudocode conventions.	CO1	5M
	b)	Write an algorithm to add two m X n matrices. Determine the time complexity of the algorithm in terms of program steps by using the step count approach.	CO1	5M

Unit - II

4.	a)	What is divide and conquer strategy? Write control abstraction for it.	CO2	5M
	b)	Write an algorithm for sorting the given elements using Quick sort.	CO2	5M

(OR)

5.	a)	What is a Minimum Cost Spanning tree? Find Minimum cost spanning tree for the following graph using krushkal's algorithm.	CO2	5M



	b)	State the Job – Sequencing with deadlines problem. Find an optimal sequence to the instance 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).	CO2	5M

Unit - III

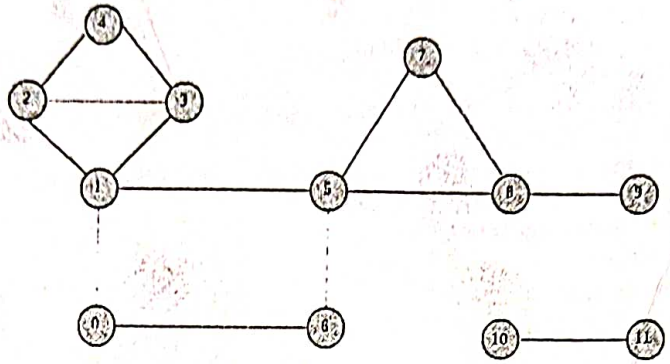
6.	a)	Define Feasible solution and Optimal solution. Describe each by means of appropriate examples.	CO3	4M
	b)	Assume that there are 4 cities A,B,C,and D that are to be visited by a salesperson. Following matrix represents the cost of moving from one city to the other. Solve this TSP using dynamic programming approach.	CO3	6M

	A	B	C	D
A	0	2	9	10
B	1	0	6.	4
C	15	7	0	8
D	6	3	12	0

P.T.O.

(OR)

7.	a)	By means of an example graph, illustrate the working of DFS algorithm.	CO3	5M
	b)	Explain how to find the biconnected components of the following graph:	CO3	5M



Unit – IV

8.		Find the optimal solution for the following sum of subsets problem. (w1,w2,w3,w4) = (7,11,13,24) where n=4 and m=31.	CO4	10M

(OR)

9.	a)	Explain in detail about P, NP and NP-Complete problems.	CO4	6M
	b)	Briefly describe least cost branch and bound technique.	CO4	4M