

Time: 3 Hours

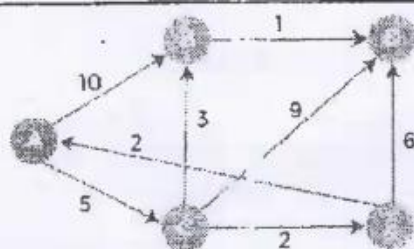
Maximum Marks: 50

Section – A

Attempt All Questions

4 X 5 = 20 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	Explain the various criteria used for analyzing algorithms.	4	CO1	U	C
2	(i) Write algorithm for radix sort procedure. (ii) Sort the following elements using radix sort. 16, 202, 75, 29, 503, 81	4	CO2	A	P
3	What is consolidate in fibonacci heap. Also, explain extract min procedure.	4	CO3	R,A	P
4	Define spanning tree. Discuss the design steps in prims algorithm to construct minimum spanning tree with an example.	4	CO5	U,A	C
5	Find shortest path for the following graph using dijkstra's algorithm.	4	CO4	A	C,P



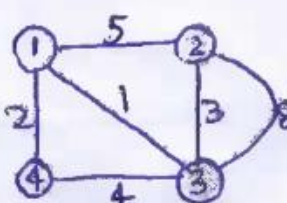
or

Write algorithmic procedure for single source shortest path algorithm and analyze its time complexity.

Section – B

Attempt All Questions

3 X 5

No.	Detail of Question	Marks	CO
6	Find the optimal solution for the following fractional knapsack problem. Capacity (m)=30, Number of objects (n)=3 and $(w_1, w_2, w_3)=(10, 20, 30)$, $(p_1, p_2, p_3)=(12, 20, 24)$.	3	CO5
7	Differentiate between BFS and DFS traversal with the help of an example.	3	CO4
8	Compute shortest path for the following graph using Floyd-Warshall algorithm. 	3	CO6
9	Find optimal parenthesis to obtain product for the given chain of matrices A1, A2, A3, A4 and A5 with the following dimensions. A1:30x35, A2:35x15, A3:15x25, A4:25x20, A5:20x18.	3	CO3

10	Compare Bellman Ford and Dijkstra's algorithm. Also, discuss its time complexity.	3	CO4, CO6	U,A	C
----	---	---	----------	-----	---

Section – C

Attempt All Questions

5 X 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
11	What are the elements of dynamic programming? What is 0/1 knapsack problem? Solve the following instance using dynamic programming, knapsack capacity=10, $P=\langle 1,6,18,22,28 \rangle$ and $W=\langle 1,2,5,6,7 \rangle$.	5	CO6	U,A	P
12	Differentiate between Backtracking and Branch and Bound techniques. Write an algorithm for graph coloring problem.	5	CO7, CO8	U,A	C
13	Explain the algorithm to solve N-Queens problem. Explain how 4 Queens problem is solved using backtracking.	5	CO7	U,A	C

Note: Attempt Any Four Questions

3x 4=12

- I) Write Pseudo code for LCS Problem and analyze its complexity?
- II) How Dynamic Programming differs from Divide and Conquer?
- III) Write a program in C/C++/java/Python to implement 0/1 Knapsack?
- IV) What is NP-Complete Problems?
- V) Explain Graph Coloring Problem?

SECTION –C

Note: Attempt Any Three Questions

4x3=12

- I) Explain Rabin Karp String Matching Algorithm?
- II) What is back tracking? Explain in detail?
- III) Explain 4-queen Algorithm with explanation.
- IV) Consider the scenario in which given 3 objects with weights and profit as given below:

	Object 1	Object2	Object3
Weight	30	28	26
Profit	2000	1986	1748

Would you prefer dynamic programming to find the solution of this knapsack Problem (Capacity =54)?