**United College of Engineering and Research, Allahabad**

**Department of Computer Science & Information Technology**

**IInd Sessional Examination (2018-19)**

**B.Tech. (Vth Semester (CS & IT))**

**Design and Analysis of Algorithm**

**Subject Code: NCS-501**

**Time:** 2.00 hours **Max. Marks:** 30

**Note:** There are three sections in this paper. All sections are compulsory.

**Section-A**

**Note:** All questions are **compulsory**. Each question has equal marks. **10\*1=10**

1. Define Binomial Tree.
2. Define Binomial Heap.
3. Define potential function of Fibonacci Heap.
4. Explain the N-Queen problem.
5. Define Convex Hull.
6. Define Matrix Chain multiplication problem.
7. 
8. 





**Section-B**

**Note:** Attempt any **six** questions. Each question has equal marks. **6\*2=12**

1. Create a Binomial heap of 43 elements.
2. Determine the amortized cost of **Decrease key operation** of Fibonacci heap.
3. Write an algorithm for finding a node with minimum key in Binomial heap.
4. Write an algorithm for N-Queen problem.
5. Write an algorithm to display the optimal solution of Matrix Chain Multiplication problem.
6. Apply the Bellman Ford algorithm in the following graph:

**Source Vertex: A**

2

-1

4

3

5

-3

1

2

1. Write the algorithm for activity selection problem.
2. Solve the LCS problem using dynamic programming for the following data:-

**Sequence1= <G, X, T, X, A, Y, B> Sequence2= <A, G, G, T, A, B>**

**Section-C**

**Note:** Attempt any **two** questions. Each question has equal marks. **2\*4=8**

1. Write the properties of Greedy algorithm. Develop the dynamic formula for the 0/1 knapsack problem. And solve the 0/1 knapsack using above formula for the following data:-

**n= 6, v = ( 50, 20, 60, 100, 30, 70),**

**w = ( 30, 10, 60, 80, 40, 20), W= 100.**

1. Apply the floyd Warshall algorithm to the following graph.

2

1

2

-1

-8

7

10

-4

5

3

1. Describe the sum of subset problem. Write an algorithm for this problem. Apply this algorithm for the following data:-

**n= 7 w= {15, 7, 20, 5, 18, 10, 12} and m= 35.**