

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION-MAY-2019

B.Tech IVth Semester

COURSE CODE: 10B11CI411

MAX. MARKS: 35

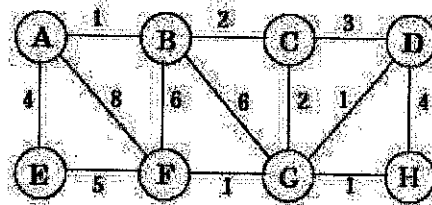
COURSE NAME: Fundamentals of Algorithms

COURSE CREDITS: 04

MAX. TIME: 2 HRS

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. [CO-4] Suppose we want to find the minimum spanning tree of the following graph.



- (a) Run Prim's algorithm, whenever there is a choice of nodes, always use alphabetic ordering (e.g., start from node A). Draw a table showing the intermediate values of the priority queue.
- (b) Run Kruskal's algorithm on the same graph. Show how the disjoint-sets data structure looks at every intermediate stage (including the structure of the directed trees). Marks [5+5]
2. [CO-5,6] Devise an $O(n^3)$ algorithm to extract the longest palindromic subsequence from the sequence A, C, G, F, G, T, C, A, A, A, A, T, C, G. (A subsequence is palindromic if it is the same whether read left to right or right to left.) Marks [7]
3. [CO 6] Find the minimum no of operations required for the chain matrix multiplication of $A_{30 \times 30} \times B_{30 \times 3} \times C_{3 \times 15} \times D_{15 \times 60}$ using dynamic programming and put the parenthesis of optimal chain multiplication. Marks [7]
4. [CO 6] What is a K-SAT problem? Explain with an example the exhaustive search of a 4-SAT problem and also mention the complexity. Marks [5]
5. [CO 6] Define NP-class of problem. Explain, weather, $P \in NP$? Define NP-Complete problems. Marks [2+2+2]